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## **The Economic Effects of Financing a Large and Permanent Increase in Government Spending**

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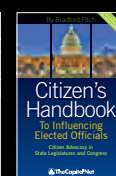
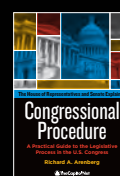
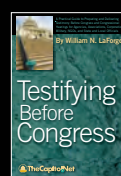
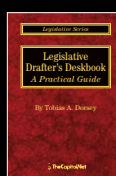


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## Abstract

In this working paper, we analyze the long-term economic effects of financing a large and permanent increase in government expenditures of 5 percent to 10 percent of gross domestic product (GDP) annually. This paper does not assess the economic effects of the increased government spending and focuses solely on the effects of their financing.

The first part of the paper reviews the channels through which different financing mechanisms affect the economy. Specifically, the review focuses on how taxes on labor income, capital income, and consumption affect how much people work and save. The general finding is that increasing taxes leads to lower GDP and personal consumption. Of the different tax policies examined, consumption taxes are likely to have the smallest effects on saving and work decisions and hence the smallest negative consequences on future economic growth. Finally, deficit financing leads to higher interest rates, a lower capital stock, lower GDP, and a greater risk of a fiscal crisis.

In practice, the Congressional Budget Office uses a suite of models to assess the economic effects of fiscal policy. The second part of the paper uses one of CBO's modeling frameworks—the life-cycle growth model—to illustrate the economic and distributional implications of raising revenues to finance a targeted amount of government spending (either 5 percent or 10 percent of GDP) through three different tax policies: a flat labor tax, a flat income tax, and a progressive income tax. To maintain deficit neutrality, tax rates for all three tax policies must rise over time to offset behavioral responses that result in smaller tax bases. After 10 years, the level of GDP by 2030 is between 3 percent and 10 percent lower than it would be without the increase in expenditures and revenues. In those scenarios, younger households experience greater loss in lifetime consumption and hours worked than older households. Additionally, the fall in lifetime consumption and hours worked is largest for higher-income households and smallest for lower-income households when a progressive income tax is used. A progressive income tax generates the largest decline in total output. It also generates the smallest decline in consumption among the bottom two-thirds of the income distribution.

*Keywords:* government spending, financing, taxes

*JEL Classification:* E62, H2, H31, H62

## Notes

Unless this paper indicates otherwise, all years referred to are calendar years.

Federal fiscal years run from October 1 to September 30 and are designated by the calendar year in which they end.

Numbers in the text and tables may not add up to totals because of rounding.

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## Summary

The method by which a large and permanent increase in government spending is financed can significantly affect the economy through changes in work and saving incentives. In this working paper, we discuss how different tax policies affect these incentives and, in turn, how they affect gross domestic product (GDP), investment, labor supply, and private consumption. We then use a general-equilibrium, overlapping-generations (OLG) model to quantify and compare the economic and distributional implications of raising revenues to finance a large increase in noninvestment government purchases for three different tax policies.<sup>1</sup>

This paper serves as a companion to future analyses by the Congressional Budget Office of the economic effects of large and permanent changes in different types of spending and their financing.<sup>2</sup> As such, the analysis in this paper does not include the economic effects of increased government spending. The effects of government spending programs on the economy depend on the specifics of the policy involved, including the timing of the policy's announcement, the timing of the spending, and the details of the policy's implementation. In many cases, the economic effects of a combined package of changes in spending and its financing can be approximated by examining spending and financing separately and then adding the effects together.<sup>3</sup> Finally, although we analyze a 10-year transition period, this paper addresses only permanent changes in policy, and the effects stemming from a temporary change in spending or revenues could be significantly different.

In theory, a large government program—defined here as one that would spend 5 percent to 10 percent of baseline GDP each year—could be financed by reducing existing spending, borrowing (deficit financing), or by raising additional revenues through taxes. This paper focuses on the effects of raising tax revenues for two reasons. First, financing a new, large, and permanent government program through reductions in existing spending would be extremely challenging. In 2019, total mandatory and discretionary spending was 19.2 percent of GDP, which suggests that the reductions needed to finance the new spending would be approximately a quarter to a half of all spending under current law. Second, financing a large and permanent increase in government spending through perpetual borrowing without any corresponding

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<sup>1</sup> Noninvestment government purchases do not affect the productive capacity of the economy and do not directly alter the behavior of businesses and households.

<sup>2</sup> For example, in a forthcoming paper, CBO will assess the macroeconomic effects of single-payer health care systems that are based on Medicare's fee-for-service program—including their effects on private saving, the capital stock of the economy, productivity, and long-term output—separately from the effects of the programs' means of financing.

<sup>3</sup> Government spending programs and the means of financing them can interact and affect the economy through channels not captured by analyzing the two sides of the policy separately; however, in many cases the effects of that interaction are likely to be of a smaller magnitude.



adjustment in spending or revenues at some point in the future is unsustainable. Although temporary increases in the deficit in combination with permanent changes in revenues are a possible financing mechanism, temporary policy changes are beyond the scope of this paper.<sup>4</sup>

### **Qualitative Analysis of Different Financing Methods**

If permanent spending is financed by new or increased taxes, then those taxes influence people's decisions about how much to work and save. Those decisions then affect how much the economy produces and businesses invest and, ultimately, how much people can consume. Different types of taxes have different economic effects. Taxes on labor income reduce after-tax wages, so they reduce the return on each additional hour worked. That reduced incentive to work is then partially offset because people have lower expected future income, which creates an incentive to work more to make up for their lost after-tax income. On average, the former effect is greater than the latter in CBO's assessment; therefore, higher labor taxes tend to reduce hours worked in the economy. Higher taxes on capital income, such as dividends and capital gains, lower the average after-tax rate of return on private wealth holdings (or the return on investment), which reduces the incentive to save and invest and leads to reductions in saving, investment, and the capital stock.

Taxes can also be assessed when income is consumed rather than when it is earned. A consumption tax, such as a value-added tax, does not distort households' incentives to save and invest because it does not directly alter the after-tax return on investment, so the output costs are generally considered to be lower than an equivalent income tax. That lower cost associated with a consumption tax comes about because, unlike an income tax, it does not tax the return on saving and investment, supporting a higher capital stock and output. However, by reducing the cost of time spent not working for pay relative to other goods, a consumption tax could reduce hours worked through a channel like that of a tax on labor.

### **Quantitative Analysis of Three Financing Methods**

The relative effects of labor and capital income taxes are illustrated in the framework of CBO's life-cycle growth model—a general-equilibrium, OLG model.<sup>5</sup> It is one of several tools that CBO would probably use to analyze a large change in the scope of government activity.

Using CBO's life-cycle model, we compare the effects of raising additional revenues through three illustrative tax policies: a flat tax on labor income, a flat tax on all income (including both

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<sup>4</sup> CBO has discussed the implications of increased deficits and debt elsewhere; see Congressional Budget Office, *The 2021 Long-Term Budget Outlook* (March 2020), [www.cbo.gov/publication/56977](https://www.cbo.gov/publication/56977).

<sup>5</sup> See Congressional Budget Office, "An Overview of CBO's Life-Cycle Growth Model" (February 2019), [www.cbo.gov/publication/54985](https://www.cbo.gov/publication/54985). For an overview of OLG models, see Jaeger Nelson and Kerk Phillips, "Macroeconomic Effects of Reducing OASI Benefits: A Comparison of Seven Overlapping-Generations Models," *National Tax Journal*, vol. 72, no. 4 (December 2019), pp. 671–692, <https://doi.org/10.17310/ntj.2019.4.02>.



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labor and capital income), and a progressive tax on all income. The additional revenues generated by these policies are in addition to the revenues raised by taxes that already exist and are used to finance two specific increases in government spending. The two increases in government spending are set to 5 percent and 10 percent of GDP in 2020 and grow over time at 1.5 percent per year—the constant long-run aggregate growth rate of the economy.<sup>6</sup> Those targets are historically large but roughly in line with some discussions of changes to health care policy.<sup>7</sup> The spending and financing policies quantitatively analyzed in this paper are jointly specified to ensure that the package is deficit neutral after incorporating macroeconomic effects such as changes in incomes and interest rates. That neutrality allows us to isolate the effects of the means of financing from any effects that might be brought on by changes in government debt.<sup>8</sup> Also, for illustrative purposes and to isolate the effects of increased taxes, we model the increase in government spending as an increase in noninvestment government purchases, which have no direct effects on business or household behavior. The analysis is conducted as if all policies were announced at the end of 2020 and implemented at the beginning of 2021.

**Quantitative Results.** CBO analyzes the economic effects of raising a large amount of government revenue through three stylized tax policies on a variety of key macroeconomic aggregates—such as GDP, the capital stock, labor supply, private consumption, the wage rate, and the rate of return on private wealth—as well as how those effects are distributed across different generations and people with different levels of income. All aggregates are measured in real (inflation-adjusted) terms. The distributional effects of the policies are examined through changes in the distribution of private consumption and hours worked.

This paper shows that flat labor and flat income tax policies have similar effects on output; labor taxes reduce the labor supply more, and income taxes reduce the capital stock more. For all three policies, the decline in income contracts the tax base considerably over time. As a result, to continuously generate enough revenues to finance the increase in government spending in each year, tax rates must steadily increase over time to account for the decline in the tax base. Moreover, labor and capital taxes put upward pressure on interest rates by reducing the capital-to-labor ratio over time when additional revenues are used to finance noninvestment government purchases. Those higher interest rates increase the government’s interest costs and further

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<sup>6</sup> Those magnitudes correspond to approximately \$1.0 trillion and \$2.1 trillion in 2021 and \$1.5 trillion and \$3.0 trillion in 2030.

<sup>7</sup> For example, CBO recently examined five illustrative options for single-payer health care systems that would increase federal subsidies by amounts ranging from roughly 5 percent of GDP to 10 percent of GDP. See CBO’s Single-Payer Health Care Systems Team, *How CBO Analyzes the Costs of Proposals for Single-Payer Health Care Systems That Are Based on Medicare’s Fee-for-Service Program*, Working Paper 2020-08 (December 2020), [www.cbo.gov/publication/56811](https://www.cbo.gov/publication/56811).

<sup>8</sup> In the model, changes in government debt affect the composition of households’ asset portfolio and the rate of return on private wealth. By ensuring that the path of debt is unchanged by the spending and financing package, we remove that latter effect on factor prices.

increase the program's financing needs. The largest declines in economic activity among the financing methods considered occur with the progressive tax on all income. Those declines occur because high-productivity workers reduce their hours worked and because higher taxes on asset income reduce the incentive to save and invest relatively more than under the two flat taxes.<sup>9</sup>

The different financing methods produce different changes in income across the distribution of households. In this paper, we analyze those distributional effects by analyzing households' lifetime consumption and hours worked across the age and income distributions. In each case, younger generations experience larger reductions in lifetime consumption and hours worked because the tax changes take place earlier in life than they do for older cohorts. With all three taxes, higher-income households experience larger drops in consumption and smaller declines in hours worked than their lower-income counterparts do. Those disparities are strongest when progressive income taxes are used.

**Limitations of the Analysis.** The quantitative analysis reported in this paper is subject to several important limitations. By design, in focusing on the effects that arise from different methods of financing, the analysis does not consider any effects of the expanded government spending. Different types of government spending have different effects on the economy. For example, well-targeted government spending on physical capital, education and training, and research and development increase the productivity of private businesses.<sup>10</sup> Productivity increases brought on by well-targeted government spending boosts GDP, private investment, and, ultimately, the amount households can consume. However, spending on productive government purchases is beyond the scope of this paper.

The model used in this paper does not include any labor or capital market frictions or price rigidities that could affect the policy implications (such as involuntary unemployment or underemployment). Households in the model used in this paper have perfect information about the path of future policy and the distribution of their potential earnings over their lifetime; moreover, households' behavior is perfectly rational and consistent with their preferences about private consumption and hours worked. Because households lack perfect information and may have preferences different from those used in the model, the estimates provided here are approximations constructed to predict aggregate responses and not the responses of specific households.

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<sup>9</sup> The model measures labor productivity in terms of the value of output a household produces per hour of work. Households are paid a wage that is proportional to their level of productivity. As a result, high-productivity households tend to be high-income households.

<sup>10</sup> For details about infrastructure spending, see Congressional Budget Office, *The Macroeconomic and Budgetary Effects of Federal Investment* (June 2016), [www.cbo.gov/publication/51628](http://www.cbo.gov/publication/51628).

The policy experiments and the model in this paper are illustrative and relatively simple in their implementation. By contrast, actual policy changes would be more nuanced, and the economic effects would differ depending on how the policies were designed and implemented. The short-run effects would also differ if the policies were announced in advance with a lag before implementation, because it would give households time to adjust their work and saving decisions in advance of the tax increase. Furthermore, if the policies were temporary—instead of permanent—the economic effects could vary significantly from those shown in this paper. (Although this paper reports only the effects of a policy change through 2030, those effects are permanent.)

Because the economic effects of any given fiscal legislation depend importantly on how individual provisions and their implementation influence behavior over the short and long terms, CBO often uses several different economic models, each of which is suited to different aspects of the policy and the analysis. The OLG model used in this paper is one of those models, and it is most suited to illustrating the long-term effects of taxation on the economy's productive capacity. Therefore, the analysis presented here does not fully reflect CBO's more comprehensive approach to estimating the economic effects of legislation.

## Financing Methods

A large and permanent increase in federal spending would result in a correspondingly large increase in the deficit unless it was paired with significant changes to the tax system. If the permanent increase in government spending of the magnitudes considered in this paper was financed only with new borrowing, primary deficits as a percentage of GDP would continually exceed the percentage growth of GDP, meaning that the debt-to-GDP ratio would rise unsustainably. Although an increase in government spending could be financed by a mix of financing methods—such as increased borrowing, reductions in other spending categories, and higher tax rates—such an approach is beyond the scope of this analysis. In general, different methods of financing would influence people's behavior and affect the overall economy in different ways. Under current law, revenues are raised from individual income taxes, payroll taxes, corporate income taxes, remittances from the Federal Reserve, excise taxes, estate and gift taxes, and other sources. Additional revenues could be raised from any of those sources or from new sources, such as a value-added tax on consumption or a carbon tax.<sup>11</sup>

To simplify the discussion, we focus here on the main ways in which labor income taxes, capital income taxes, and consumption taxes affect people's behavior. The current U.S. federal tax system already contains a mix of labor income taxes, capital income taxes, and consumption taxes. Payroll taxes are imposed on wages and other forms of labor compensation. Individual and

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<sup>11</sup> For a collection of 31 options to increase revenues, see Congressional Budget Office, *Options for Reducing the Deficit: 2021 to 2030* (December 2020), [www.cbo.gov/publication/56783](https://www.cbo.gov/publication/56783).

corporate income taxes affect both labor and capital income. Excise taxes are consumption taxes on specific goods. The combination of those taxes, along with various tax preferences for both labor and capital income, result in a hybrid system somewhere between a pure income tax and a pure consumption tax.

The three types of taxes considered each affect people's decisions about work, saving, and investment in different ways. The less a tax distorts people's decisions to work, save, and invest, the smaller the economic effects are per dollar of revenues raised. As any tax rate increases, the size of the resulting economic distortion grows.<sup>12</sup> Although the direction of those effects is often clear, their relative magnitudes are uncertain. The economic effects of raising a given amount of revenue through a consumption tax are generally smaller than those of raising the same amount through an income tax. Labor income taxes are less distortionary than capital income taxes. Although our model results consistently indicate that labor income taxes have smaller economic effects than capital income taxes, the specifics of actual tax policies can have important additional effects.

This paper focuses on the relative economic effects of raising revenues through different tax instruments. Taxes also differ in their effect on the distribution of income and in how complicated they would be to implement. Policymakers would weigh those additional factors when deciding between alternative financing mechanisms.

### **Labor Income Taxes**

A labor income tax reduces after-tax wages, so it reduces the return on each additional hour worked. That reduction induces some workers to work fewer hours and induces others to exit the labor force. The incentive to work less is partially offset by the way people respond to a reduction in after-tax income. For a given number of hours worked, an individual earns less after-tax income, and that reduction in income creates an incentive to work more. On net, an increase in labor income taxes is likely to reduce hours worked.<sup>13</sup> The direction and magnitude of the total response can depend on the size of the tax, on whether the tax is temporary or permanent, and on the time horizon considered when examining the response. Additionally, not all people respond to a change in wages in the same way. For example, a second earner in a household is likely to be more responsive to the variation in the wage rate than the first earner. Evidence is limited on how much workers would respond to a tax change of the magnitude considered in this paper.

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<sup>12</sup> For a discussion of taxes and economic efficiency, see Alan J. Auerbach and James R. Hines Jr., "Taxation and Economic Efficiency," in Alan J. Auerbach and Martin Feldstein, eds., *Handbook of Public Economics* (Elsevier, 2002), vol. 3, pp. 1347–1421, <https://tinyurl.com/yyh47zot>.

<sup>13</sup> For additional discussion, see Congressional Budget Office, *How the Supply of Labor Responds to Changes in Fiscal Policy* (October 2012), [www.cbo.gov/publication/43674](http://www.cbo.gov/publication/43674).

## Capital Income Taxes

Capital income taxes are taxes on the return on investment. The individual income tax combines a tax on labor income and a tax on capital income, such as interest, dividends, capital gains, and certain business profits. The corporate income tax and estate tax also apply a tax to capital income. By reducing the return on investment, capital income taxes reduce the incentive to save and invest. Because of that effect on saving, which distorts the allocation of resources across periods, the economic distortions of taxes on capital are generally viewed as being larger than those of labor income taxes. The magnitude of the effect of capital income taxes on saving is uncertain and depends on the specifics of the tax change analyzed.<sup>14</sup>

## Consumption Taxes

Consumption taxes, which tax goods and services purchased for personal use, introduce fewer incentives to reduce saving than income taxes do. Under an income tax that covers both labor and capital income, income is taxed when it is earned, regardless of whether it is consumed in that year or saved for future consumption. If it is saved, then with an income tax, the return on the saved income is taxed again. By contrast, a consumption tax imposes a tax on current-year income that is consumed, but it exempts income saved for future consumption. That saved income is taxed only when it is used to fund future consumption.

Consumption-based taxes can take different forms and are used widely outside the United States. Similar economic effects could arise from a uniform sales tax on all goods and services, a value-added tax, or the combination of a tax on labor income and a business-level tax on the nonwage components of value added.<sup>15</sup> An economically significant characteristic of consumption taxes is that they do not directly affect the return on investment and thus people's decisions about how much to save.<sup>16</sup>

Consumption taxes are generally more efficient than income taxes because they do not distort saving decisions by altering the return on saving. However, consumption taxes do still affect people's behavior. They provide incentives for people to consume more of any goods that fall outside the consumption tax base. Even with a broad-based consumption tax, time spent on nonmarket activity remains untaxed. As a result, consumption taxes potentially increase people's time spent on nonmarket activity and thus reduce hours worked for pay in the labor market. Offsetting that change, a consumption tax reduces the value of existing wealth, which may result

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<sup>14</sup> For a discussion of how taxation affects saving, see B. Douglas Bernheim, "Taxation and Saving," in Alan J. Auerbach and Martin Feldstein, eds., *Handbook of Public Economics* (Elsevier, 2002), vol. 3, pp. 1173–1249, <https://tinyurl.com/yyh47zot>.

<sup>15</sup> For a discussion of tax equivalences, see Alan J. Auerbach, *Tax Equivalences and Their Implications*, Working Paper 25158 (National Bureau of Economic Research, October 2018), [www.nber.org/papers/w25158](http://www.nber.org/papers/w25158).

<sup>16</sup> Although consumption taxes do not alter people's incentives to save, changes in consumption tax rates over time can do so by altering the cost of future consumption relative to that of current consumption.

in some people working more. Furthermore, although consumption taxes do not tax the normal return on capital, they can tax supernormal returns associated with rents, economic profits, or aggregate risk. Overall, the magnitude of the saving and labor supply responses to consumption taxes is uncertain.

Research indicates that transitioning from an income-based to a consumption-based tax system would increase the overall level of GDP.<sup>17</sup> For example, David Altig and others found that transitioning from the existing income tax system to a consumption tax would increase long-run output by more than 9 percent. However, many of the gains from that transition occur because it would eliminate distortions that exist under the current tax system and because a consumption tax would impose a tax on wealth via the existing stock of capital. That tax on existing capital does not directly alter incentives, but it allows for a lower, revenue-neutral consumption tax rate. Adding a consumption tax to the existing tax system to raise additional revenues would not have those positive effects from eliminating the distortions of the current tax system. However, it would probably generate smaller effects on the economy than would result from raising the same amount of revenue through direct taxes on labor and/or capital income.

### **Deficit Financing**

Perpetually financing a large and permanent increase in government spending of the magnitude considered in this paper through increased borrowing—without a corresponding increase in revenues at some point in the future—is unsustainable. However, temporary deficit financing could be used in conjunction with other tax increases like those discussed above. In general, large debt and deficits make the economy more vulnerable to rising interest rates and, depending on how that debt is financed, rising inflation. Those higher interest rates lower investment in the private sector, and that crowding out of investment reduces output and consumption.

Although an increase in government borrowing strengthens the incentive to save—in part, by boosting interest rates—the resulting rise in private saving is not as large as the increase in government borrowing; national saving, or the amount of domestic resources available for private investment, therefore declines. Private investment falls by less than national saving does in response to larger government deficits, however, because the higher interest rates that are likely to result from increased federal borrowing tend to attract more foreign capital to the United States. That inflow of capital would translate into a wider current account deficit. When investment in capital goods declines, workers have less capital to use in their jobs, on average.

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<sup>17</sup> See David Altig and others, “Simulating Fundamental Tax Reform in the United States,” *American Economic Review*, vol. 91, no. 3 (June 2001), pp. 574–595, <https://tinyurl.com/y2geqdvu>; and Gilbert E. Metcalf, “Labor Supply and Welfare Effects of a Shift From Income to Consumption Taxation,” in Martin Feldstein and James Poterba, eds., *Empirical Foundations of Household Taxation* (University of Chicago Press, 1996), pp. 77–97, [www.nber.org/chapters/c6237](http://www.nber.org/chapters/c6237).



As a result, on average, they are less productive, they receive lower compensation, and they are less inclined to work. Thus, output and consumption fall.<sup>18</sup>

## Model and Methodology

For the quantitative analysis in this paper, CBO uses its life-cycle growth model (also known as an overlapping-generations model). In the model, a period is equal to one year, and the economy is populated with heterogeneous households, perfectly competitive firms, and a government that engages in taxes, government purchases, and transfers. The environment is a large open economy whereby foreign investors purchase a fixed proportion of the domestic government's debt in each period. We first run a benchmark simulation of the economy in which government spending each year is adjusted so that the level of the federal debt held by the public as a share of GDP tracks CBO's projections.<sup>19</sup> We then simulate the economy under a policy change—such as an increase in labor income tax rates or an increase in labor and capital income tax rates—and compare the model results with those from the benchmark simulation.

### Households

Households are modeled as heterogeneous individuals, and they differ by age, wealth, labor productivity, average lifetime earnings, and ability to save.<sup>20</sup> Individuals in households become economically active at age 21 and live for a maximum of 80 periods. Each successive generation is larger than the last as the population grows over time. In each period of life, households face age-dependent mortality risk. From ages 21 to 75, households' labor productivity is uncertain and idiosyncratic. They optimally choose their labor supply until age 75, at which point everyone retires. In each period, households also make a consumption-saving decision. Households are altruistic and derive utility from leaving bequests to younger households when they die. All bequests in each period are collected and redistributed to surviving households in accordance with their age and income level.

In each period, households can receive income through their labor and asset holding in addition to receiving transfers from the government and bequests from older generations. Households pay taxes on their taxable income and consumption. The remainder of households' resources are then split between consumption and saving among households that have access to financial markets.

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<sup>18</sup> For a more detailed discussion of the implications of increased deficits and debt, see Congressional Budget Office, *The 2021 Long-Term Budget Outlook* (March 2021), [www.cbo.gov/publication/56977](https://www.cbo.gov/publication/56977).

<sup>19</sup> See Congressional Budget Office, *The 2020 Long-Term Budget Outlook* (September 2020), [www.cbo.gov/publication/56516](https://www.cbo.gov/publication/56516).

<sup>20</sup> An exogenous proportion of households is precluded from accumulating wealth in the model. Although those nonsavers can still choose how much to work in each period, they consume their disposable income in each period of life.

Nonsaver households that do not have access to financial markets spend the remainder on consumption.

### **Production**

Firms are perfectly competitive and have access to a constant-returns-to-scale Cobb-Douglas production technology that uses capital and labor as inputs. In addition to the endogenous factors of production, exogenous growth occurs in both economywide productivity and population size.

### **Government**

In the benchmark simulation, the government collects revenues from a progressive income tax on labor, a flat tax on asset income, payroll taxes, excise taxes, and a lump-sum tax on households. The government operates an old-age and survivors' insurance program that follows the current law's primary insurance amount benefit formula and proxies for households' average indexed monthly earnings, with households' average labor income using wage growth as the index. The government also makes lump-sum transfers to households on a per capita basis that account for other transfer program outlays. All bequests redistribute back to households on the basis of their age and labor productivity level. The government also purchases goods and services. Those purchases are valued independently of private consumption by consumers and therefore do not affect households' behavior. For that reason, the model can isolate the behavioral effects of raising tax rates on various types of income. The government is free to operate a budget surplus or deficit in any given period, and it pays an interest rate on its debt that is proportional to the rate of return on capital.

### **Fiscal Closure**

In CBO's OLG model, a necessary condition for economic growth to converge on its balanced growth path is that government debt as a share of output must stabilize at some point in the future. The current-law benchmark scenario already shows that, absent adjustments, the primary deficit as a share of GDP would increase perpetually. As a result, at some point in the future, the model will require a policy adjustment either through changes in spending or through revenues to stabilize the debt-to-GDP ratio. That restriction is often referred to as a closure rule or fiscal closure. To limit the effects of the fiscal closure assumption on the analysis, the model begins reducing government purchases starting in 2031 to stabilize the debt-to-GDP ratio by 2040.<sup>21</sup>

### **Policy Descriptions and Timing of Events**

The quantitative analysis in this paper examines the effects of three illustrative ways to raise revenues through alternative forms of income taxation in response to an increase in government spending. In each case, government spending is increased, and taxes are adjusted to raise

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<sup>21</sup> For a discussion of the effects of fiscal closing assumption, see Rachel Moore and Brandon Pecoraro, "Dynamic Scoring: An Assessment of Fiscal Closing Assumptions," *Public Finance Review*, vol. 48, no. 3 (April 2020), pp. 340–353, <https://doi.org/10.1177/1091142120915759>.

additional revenues. All three financing methods are illustrative and are in addition to taxes that already exist.

- The first method is a uniform tax on labor income only. That tax is like the Medicare hospital insurance payroll tax, which has no maximum taxable income (unlike the Old-Age, Survivors, and Disability Insurance payroll taxes).
- The second method is a flat tax on all sources of income. That type of tax differs from the current income tax in having a single tax rate that is constant for all incomes. As a result, the average tax rate on labor and capital income increases by the same amount relative to current law. Taxing both labor and capital income results in the tax having a broader base than the existing income tax system.
- The third method is a progressive tax on labor income and a flat tax on capital income. The degree of progressivity is designed to be similar to that under the current-law income tax. In that scenario, all income tax rates increase by the same proportion. The proportional increase in current-law tax rates results in a larger increase in the tax rate on capital income relative to the financing method, which increases the tax rates on labor and capital income by the same amount.

We analyzed the effects of financing two targeted amounts of noninvestment government purchases in each year under the three tax policies discussed above. The first target starts at 5 percent of GDP for 2020 and grows at 1.5 percent per year, which is the constant steady-state growth rate of the benchmark economy over time. The second targeted amount starts at 10 percent of GDP for 2020 and grows at the same rate of 1.5 percent per year. The analysis is conducted as if all policies were announced at the end of 2020 and implemented at the beginning of 2021.<sup>22</sup>

From 2021 through 2030, tax policy adjusts in each year to ensure that the increase in government spending and the change in revenues are deficit neutral (inclusive of budgetary feedback; see Table 1).<sup>23</sup> Tax rates are held fixed at their 2030 levels after 2030. The additional revenues are used for noninvestment government purchases to keep federal debt held by the public unchanged from the benchmark economy in each year through 2031. Noninvestment

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<sup>22</sup> Immediately imposing the policy changes in 2021—after announcing them at the end of 2020—does not allow households and firms to respond before the policy is implemented. The effects of longer lags between policy announcement and enactment fall beyond the scope of this paper. However, that consideration could be important when analyzing actual policy proposals.

<sup>23</sup> Budgetary feedback refers to the effect changes in the economy have on the government's budget. For example, the contraction of the tax base after households choose to work less—and the subsequent changes in the wage rate, among other things—in response to an increase in a labor tax is taken into consideration when determining the deficit-neutral tax rate.

government purchases do not directly affect households' or firms' behavior or, therefore, the economy. Furthermore, ensuring that the program is deficit neutral prevents any changes in government debt from affecting households' behavior. Such government spending is hypothetical but useful in this paper, which focuses on the economic effects of financing and not the effects of the spending. The lack of behavioral response to such spending allows us to isolate the effects of the means of financing from any economic effects resulting from changes in government spending.

In the benchmark economy—the economy under current law—debt as a share of GDP matches the projection in CBO's long-term budget outlook from 2020 through 2031.<sup>24</sup> Under each of the policy simulations, the financing mechanisms target the path of debt that prevails in the benchmark economy through 2031. Beginning in 2031, across all simulations, the government adjusts noninvestment government purchases to stabilize the debt-to-GDP ratio by 2040.

## **Economic Effects of Raising Government Revenues**

The economic effects of raising government revenues to finance increases in government spending across three different tax policies are shown in Table 2. The three financing methods are a uniform tax on labor income only, a uniform tax on all income, and a combination of a progressive tax on labor with a uniform tax on capital. In each year of the simulation, the three financing methods generate enough revenues to finance a fixed amount of noninvestment government purchases in addition to ensuring deficit neutrality. All three tax policies reduce GDP. However, although the amount of noninvestment government purchases does not change over time, the share of total government outlays as a share of GDP does change following a reduction in GDP. As a result, the change in total government outlays as a share of GDP rises over time across all six simulations relative to the benchmark economy. In the scenarios that increase spending by 5 percent of GDP for 2020, outlays as a share of GDP rise from 5 percent to 6 percent of GDP by 2030. In the scenarios that increase spending by 10 percent of GDP for 2020, total outlays as a share of GDP rise from 10 percent to 14 percent by 2030. The rise is primarily a result of lower GDP growth but also higher debt-servicing costs for the government.

### **Deficit-Neutral Tax Rates**

Larger increases in government spending require larger increases in the taxes used to finance them (see Table 1). That relationship is nonlinear, because the taxes change households' work and saving decisions and ultimately contract the tax base onto which they are applied, in addition to increasing the government's debt-servicing costs. To finance an additional 5 percent of GDP for 2020 in spending and maintain deficit neutrality, the average tax on labor income increases from 17.7 percent in 2020 to between 23.9 percent and 27.5 percent in 2030, depending on the

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<sup>24</sup> See Congressional Budget Office, *The 2020 Long-Term Budget Outlook* (September 2020), [www.cbo.gov/publication/56516](https://www.cbo.gov/publication/56516).

means of financing. That rise reflects an increase of 6.2 percentage points to 9.9 percentage points in the average tax rate on labor income, which more than doubles—to between 12.7 percentage points and 20.7 percentage points—when the increase in spending is set at 10 percent of GDP for 2020. To finance an additional 5 percent (10 percent) of GDP for 2020 in spending, under a flat tax on all income, the average tax on capital income increases from 15.4 percent in 2020 to 22.9 percent (30.9 percent) in 2030. To finance an additional 5 percent (10 percent) of GDP for 2020 in spending, under a progressive tax on all income, the average tax on capital income increases from 15.4 percent in 2020 to 29.1 percent (45.4 percent) in 2030.

### **Macroeconomic Aggregates**

All three financing mechanisms directly tax the factors of production, yielding declines in the supply of capital and labor and, therefore, in GDP and private consumption. The size of the effects on GDP varies significantly depending on the amount of revenues raised and the type of tax used to generate them (see Figure 1). An increase in progressive taxes on all sources of income leads to the largest drop in capital among the three financing mechanisms quantified in this paper (see Figure 2). Because higher-income households save a larger proportion of their income than lower-income households, their saving choices have a larger effect on the capital stock. A progressive income tax imposes higher labor tax rates on those households than a flat income or flat labor tax and thus reduces the capital stock more. That is true in the simulations, even though the increase in the average tax rate on labor income under a progressive income tax is smaller than the increase under a flat labor tax. Furthermore, the after-tax rate of return on private wealth falls the most under a progressive income tax, which reduces the incentive to save. A uniform tax on labor and a flat tax on all income have smaller effects on capital stock of similar sizes.

Progressive income taxation leads to the largest drop in labor supply (see Figure 3). The net result of the labor and capital movements is that long-run GDP declines the most under progressive income taxation. Private consumption also drops the most under progressive income taxation (see Figure 4). A progressive income tax generates the largest fall in total consumption, but it also generates the smallest decline in consumption for the bottom two-thirds of the income distribution (see the next section).

Although the three financing systems reduce GDP over time relative to the benchmark economy, total economic output continues to grow over time. Between 2020 and 2030, real GDP in the benchmark economy grows by 1.5 percent per year on average. That represents the combined effect of growth in labor productivity and the labor force. In simulations in which taxes increase to finance an increase in government spending of 5 percent of GDP, real GDP increases by 1.1 percent, 1.1 percent, and 1.0 percent per year on average for a labor tax, flat income tax, and progressive income tax, respectively. Real economic growth under an increase in government spending of 10 percent is 0.7 percent, 0.8 percent, and 0.4 percent per year on average for a labor tax, flat income tax, and progressive income tax, respectively. Those estimates of growth do not

# Pocket Constitution



The Declaration of Independence  
The Constitution of the United States  
The Bill of Rights  
Amendments XI–XXVII  
Gettysburg Address



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include any economic effects of the spending program itself. Moreover, following the stabilization of the debt-to-GDP ratio, economic growth eventually returns to its long-run rate of 1.5 percent per year, although the level of GDP is lower relative to the benchmark economy.

### **Wages, Rates of Return, and Interest Rates**

For all financing mechanisms, the after-tax wage rate declines relative to the rate in the benchmark economy over time as the capital-to-labor ratio declines and the average tax on labor income rises. Because the capital stock declines—in percentage terms—more than the supply of labor, the after-tax wage rate falls as the rate of return on private wealth increases (see Figure 5).

The rise in the rate of return on private wealth comes from the increase in the marginal product of capital. Although the progressive income tax increases interest rates the most relative to the benchmark economy, it yields a smaller increase in the after-tax rate of return on private wealth because of the increased tax on asset income (see Figure 6). The interest rate that the government pays on its debt is modeled as a proportional discount off the marginal product of capital. Over time, the increase in the interest rate paid on the stock of outstanding government debt adds to the financing needs of the program.

### **Distributional Effects of Raising Government Revenues**

We examined the distributional effects of the policies by income and birth cohort—specifically, the differences in private consumption and hours worked relative to the amounts in the benchmark economy. Within birth cohorts, households vary by their initial wealth, earnings history, social security wealth, and ability to save. We analyzed only the average effects across households within each birth cohort and income group. Because those averages have an underlying distribution, however, the average effects may not reflect all households within each birth cohort and income group.

We focused on the distributional effects on lifetime consumption and hours worked because those are the two factors in the model that households choose to maximize their well-being. An increase in consumption or a reduction in hours worked increases a household's well-being, all else being equal. The policies considered in this paper tend to reduce consumption and hours worked over a household's lifetime. The ultimate effect of a policy on a household's well-being depends on the relative weight a household places on private consumption and hours worked within the structure of the model.<sup>25</sup>

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<sup>25</sup> In the OLG model there are no labor market frictions that cause involuntary unemployment or underemployment. Although it is possible for policies to increase or decrease labor market frictions, those channels are not present in the model. As a result, all reductions in hours worked reflect optimal choices made by households.

## Consumption

Across all three financing mechanisms, older cohorts, on average, experience smaller declines in lifetime consumption than younger cohorts, largely because the higher taxes affect fewer years of their lives (see Table 3 and Figure 7). Moreover, higher-income households experience the largest percentage decline in lifetime consumption relative to their lower-income counterparts within the same birth cohort (see Table 4). That difference occurs, in part, because transfer payments—which are unaffected by the changes in tax policy—make up a smaller proportion of higher-income households’ lifetime consumption.

Lower-income households experience the smallest decline in lifetime consumption under the progressive income tax. That is because they face the smallest increase in their taxes due to the progressivity of the federal tax on labor income and because low-income households have relatively little capital income. Higher-income households experience the largest decline in lifetime consumption under the progressive income tax because they incur a larger increase in both labor income taxes and capital income taxes. Moreover, the after-tax wage falls the least under a progressive income tax, whereas the after-tax rate of return on private wealth falls the most. That further reduces the lifetime consumption of higher-income households, which, on average, hold more wealth.

Under a flat labor or flat income tax, the distributional effects on average lifetime consumption are similar. The after-tax rate of return on private wealth is higher under a flat labor tax than under a flat income tax. That partially offsets the larger decline in the after-tax wage rate under a flat labor tax for households that have at least some wealth. As a result, households with wealth experience higher lifetime consumption under a flat labor tax than a flat income tax across the income distribution. In contrast, nonsavers—households that have no access to financial markets and hold no wealth—experience a larger decline in lifetime consumption under a flat labor tax.

## Hours Worked

Older cohorts, on average, reduce their lifetime hours worked the least relative to their younger counterparts across all three financing mechanisms (see Table 5 and Figure 8). That is because they are only able to adjust hours worked in the years after the policy change has gone into effect. Additionally, under the flat labor and flat income tax policies, lower-income households reduce their labor supply more than their higher-income counterparts within the same birth cohort (see Table 6).<sup>26</sup> That relationship is reversed under a progressive income tax, however, because the after-tax wage rate falls the most among higher-income households as a result of the progressivity of the labor tax.

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<sup>26</sup> Although lower-income households decrease work hours by a greater percentage relative to the benchmark economy, the decreases among higher-income households have a larger effect on the effective aggregate labor supply because of their higher productivity.

The reduction in hours worked occurs because households not only work fewer hours during their career but also retire earlier. Under a labor tax, on average, households choose to retire earlier than they do under a flat income tax or progressive income tax. That result is largely driven by the reduced incentive to work—through lower after-tax wages—and higher rates of return on their asset holdings. Higher rates of return in later life mean that households can sustain the same level of consumption in retirement with a smaller stock of wealth (all else being equal).

### **Intergenerational Standard of Living**

The percentage change in lifetime consumption across different birth cohorts is a useful metric for understanding the relative trade-offs across generations, but it does not capture underlying trends in economic growth and the rising standard of living (that is, the rise in real per capita consumption over time). Although the financing mechanisms analyzed in this paper generate the largest reductions in lifetime consumption among younger generations, those same generations also experience higher levels of real consumption over their lifetime than their older counterparts because of the rise in labor productivity over time.

In the model's benchmark economy, the average household born in 2020 experiences 2.4 times as much real consumption over its lifetime as the average household born 80 years earlier, in 1940 (see Figure 9). Although financing large government spending programs reduces real lifetime consumption, on average, among households born in 2020, they still are projected to have real lifetime consumption equal to between 1.7 and 2.1 times that of their 1940 counterparts, on average.

### **Limitations of the Analysis and Uncertainty**

The effects of the policies CBO analyzed in this paper are illustrative, highly uncertain, and subject to several limitations. In practice, CBO uses a suite of economic models to evaluate fiscal policy; the OLG model used in this paper is not the only input into CBO's more comprehensive approach.

The economic effects of fiscal policies greatly depend on their design and implementation, and policies with alternative specifications would generally have effects different from those presented in this paper. For example, the noninvestment government purchase analyzed in this paper does not affect the productive capacity of the economy or alter the behavior of businesses and households. However, productive government purchases and transfer payments can affect productivity and the behavior of businesses and households that, in turn, affect output, investment, and private consumption. For well-targeted government purchases that increase private sector productivity, the effects boost GDP, investment, and the amount households can consume. The net effect of a well-targeted spending program and its means of financing would depend on the nature of the spending and the details of the financing mechanism.

Additionally, the immediate implementation of the tax policies analyzed in this paper would prevent households from adjusting their consumption and saving decisions in anticipation of a future tax increase. If the policies were announced in advance—or were temporary—the economic effects would differ from those in this analysis, particularly in the short run. Moreover, the behavior of households is modeled as though they all have perfect information and foresight. Because of that structure, the results we present are approximate predictions. If households' saving behavior differed—due to different or imperfect information—from those predicted by the model in response to a change in a particular tax, the resulting change in the capital stock would reflect that disparity, and the economic effects would be different.

The model does not include involuntary unemployment or underemployment. As such, any change in hours worked is the result of optimal choices made by households in the model and does not capture all potential adverse effects the policy may have on the labor market directly. Furthermore, because households are able to choose how many hours they wish to work in each year, the model does not include the effects of broader structural norms that limit the menu of labor choices made available to workers (such as part-time versus full-time work). Additionally, all markets are in equilibrium in the short run in the model. The model does not reflect any changes in aggregate demand driven by the direct effects of increases in government purchases or in tax rates associated with short-run frictions in the labor, goods, or factor markets.

### **Alternative Methodological Approaches**

The life-cycle growth model used in this paper is only one of several modeling frameworks that CBO uses to evaluate the economic effects of fiscal policy. CBO often combines insights gleaned from different models because, in the agency's view, no single model can adequately capture all relevant economic effects of fiscal policy changes.

For example, when analyzing the economic effects of federal tax policies that alter the taxes on labor income, CBO uses models that capture the different ways in which employment and hours worked respond to changes in tax rates. One of those models estimates the change in labor supply—at a given point in time—in response to a change in after-tax compensation. That model provides for differential effects across demographic groups and accounts for interactions among specific tax policies in estimating changes in marginal tax rates. But it does not incorporate the effects arising from the changes in before-tax wages, the interest rate, and other macroeconomic variables brought about by a tax change.

To estimate and incorporate those effects into an analysis, CBO generally employs two models—a Solow-type growth model and the dynamic general-equilibrium, OLG model used in this

analysis.<sup>27</sup> The Solow-type growth model uses estimates—like those described above—of how much the labor supply changes at a given point in time in response to a change in after-tax compensation to estimate the economic effects of a policy change. In contrast, the life-cycle growth model uses estimates of the responsiveness of the labor supply that depend on how people expect their after-tax compensation to change over time. However, CBO’s life-cycle model does not incorporate various relevant forms of labor market frictions (including those stemming from costly job search and matching, frictional reallocation of labor, and time lags). Those frictions can have important effects on the impact of fiscal policy changes. To capture those effects, CBO uses other models—including a dynamic-stochastic general-equilibrium model—and statistical estimates.<sup>28</sup>

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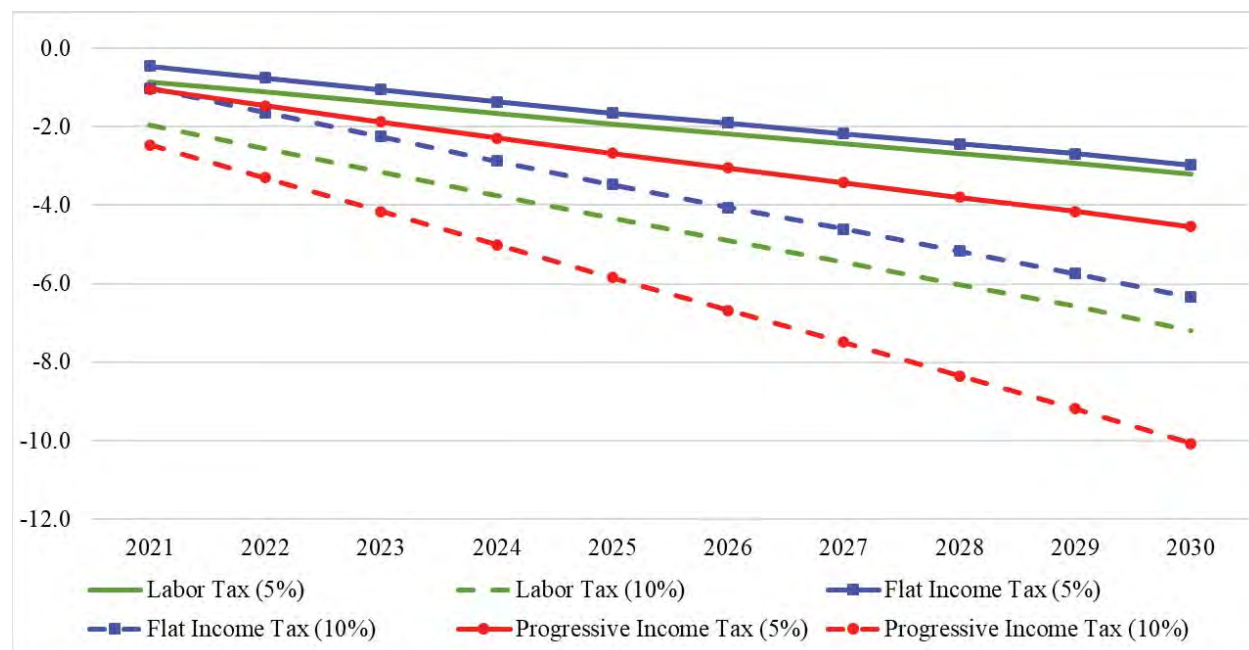
<sup>27</sup> A dynamic general-equilibrium model is one in which households and businesses interact with each other in markets for goods and capital, responding to prices—such as wages and the rates of return on saving—that are themselves determined by those interactions.

<sup>28</sup> For a description of CBO’s dynamic-stochastic general-equilibrium model, see Edward Gamber and John Seliski, *The Effect of Government Debt on Interest Rates*, Working Paper 2019-01 (Congressional Budget Office, March 2019), Appendix B, [www.cbo.gov/publication/55018](https://www.cbo.gov/publication/55018).

## Figures

**Figure 1.**  
**GDP Relative to the Benchmark Simulation**

Percent



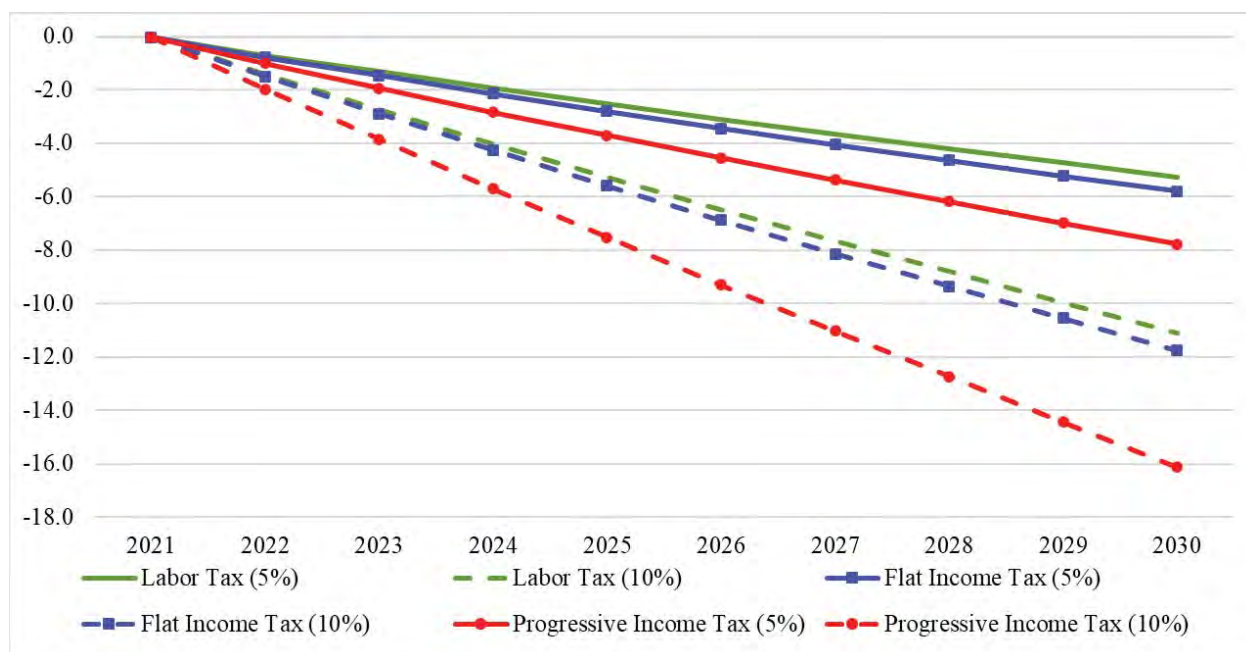
Data source: Congressional Budget Office.

The figure shows the percentage difference in the path of GDP under the six policy simulations from the path in the benchmark economy.

GDP = gross domestic product.



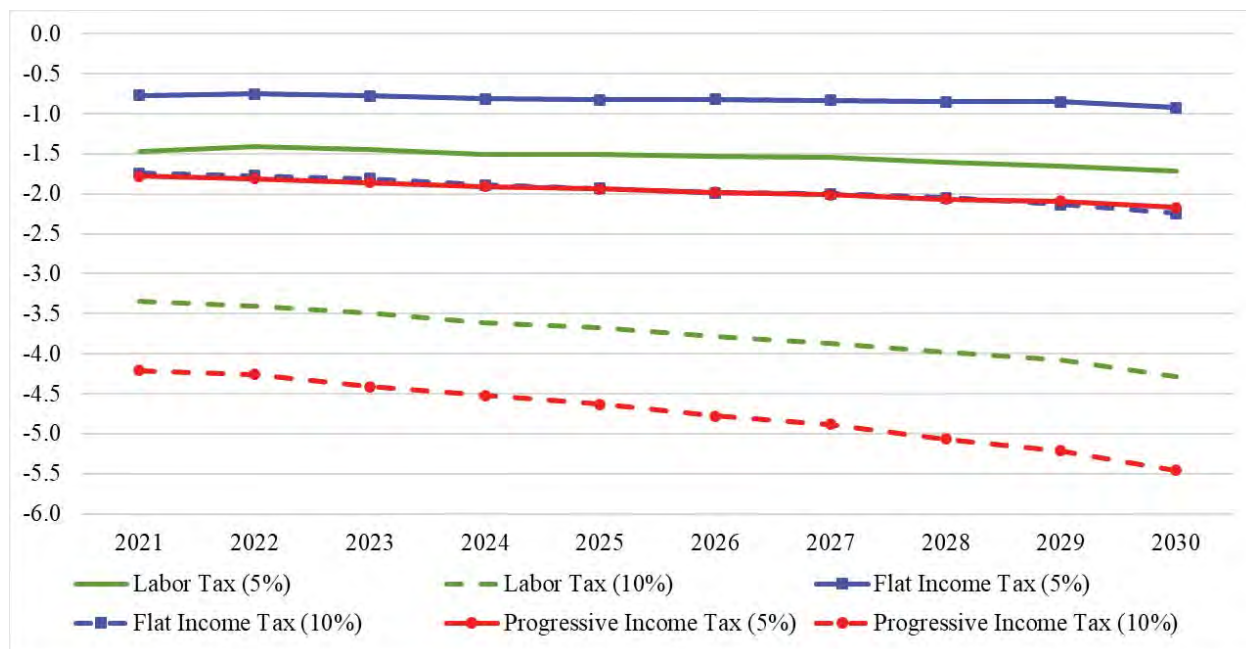
**Figure 2.**  
**Aggregate Capital Stock Relative to the Benchmark Simulation**  
 Percent



Data source: Congressional Budget Office.

The figure shows the percentage difference in the path of the capital stock under the six policy simulations from the path in the benchmark economy.

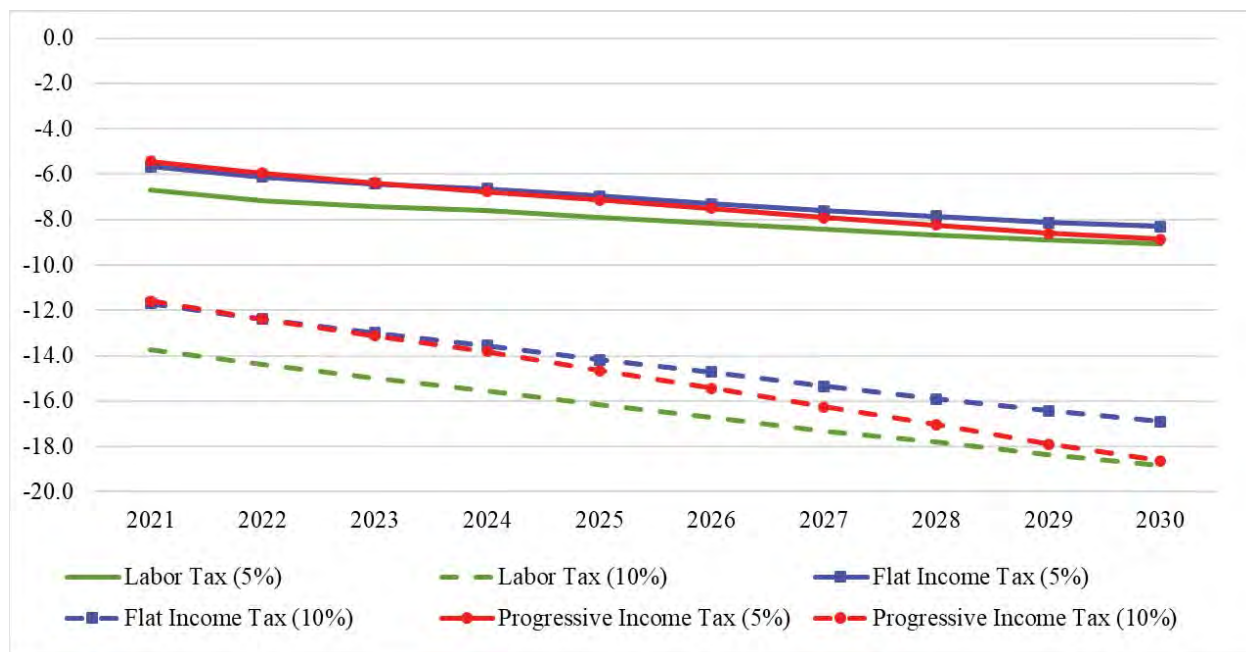
**Figure 3.**  
**Total Labor Supply Relative to the Benchmark Simulation**  
 Percent



Data source: Congressional Budget Office.

The figure shows the percentage difference in the path of labor under the six policy simulations from the path in the benchmark economy.

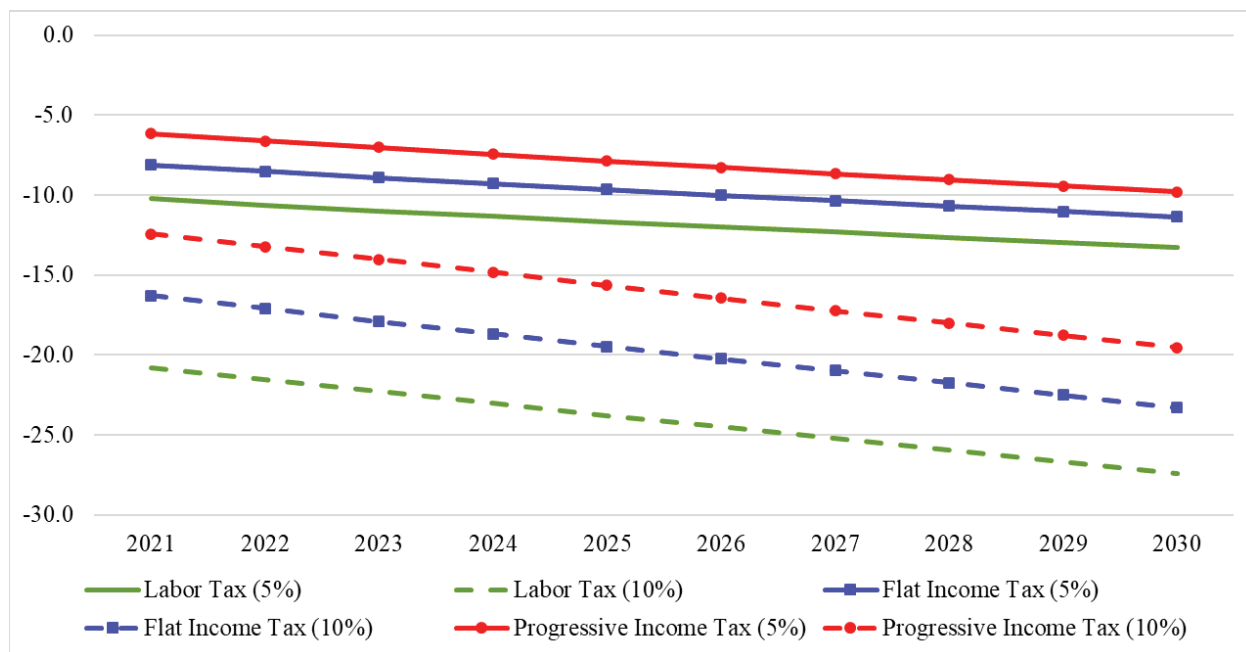
**Figure 4.**  
**Private Consumption Expenditures Relative to the Benchmark Simulation**  
 Percent



Data source: Congressional Budget Office.

The figure shows the percentage difference in the path of private consumption under the six policy simulations from the path in the benchmark economy.

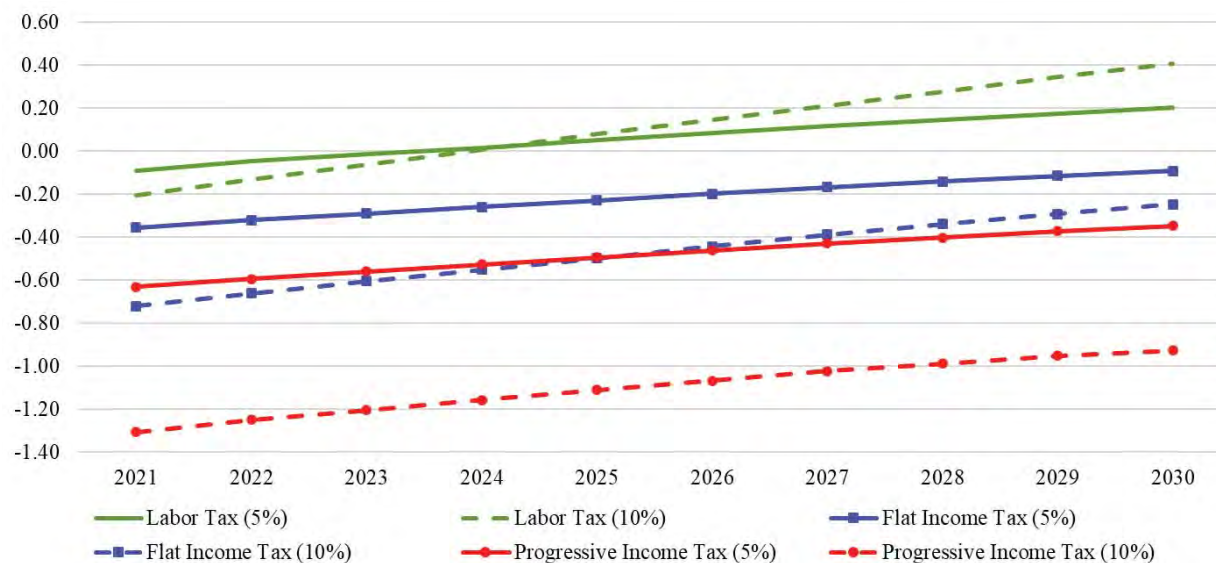
**Figure 5.**  
**After-Tax Average Wage Relative to the Benchmark Simulation**  
 Percent



Data source: Congressional Budget Office.

The figure shows the percentage difference in the path of the average after-tax wage rate under the six policy simulations from the path in the benchmark economy. The average after-tax wage rate is computed by dividing gross labor income, less taxes paid on labor income, by the total amount of labor supplied.

**Figure 6.**  
**After-Tax Average Rate of Return on Wealth Relative to the Benchmark Simulation**  
 Percentage Points



Data source: Congressional Budget Office.

The figure shows the percentage point difference in the path of the average after-tax rate of return on private wealth under the six policy simulations from the path in the benchmark economy. The average after-tax rate of return on private wealth is computed by dividing gross asset income, less taxes paid on asset income, by the total amount of private wealth held by domestic households.



**The House of Representatives and Senate Explained**

# Congressional Procedure

**A Practical Guide to the Legislative Process in the U.S. Congress**

**Richard A. Arenberg**

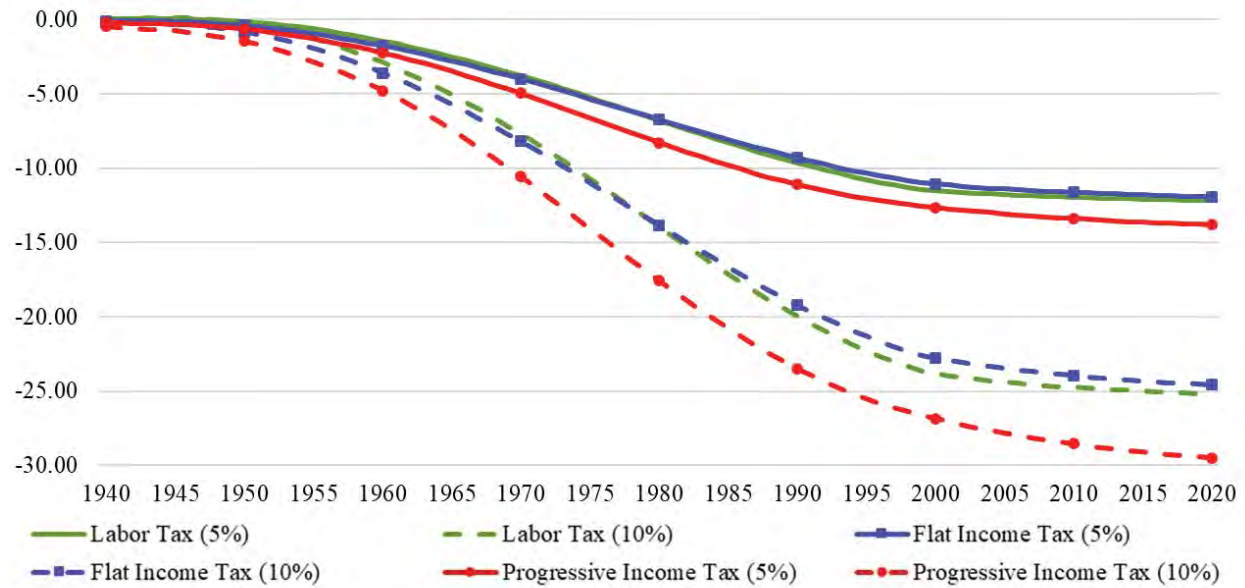
Foreword by Alan S. Frumin

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**Figure 7.**  
**Percentage Change in Average Real Lifetime Consumption, by Cohort Birth Year Relative to the Benchmark Economy**

Percent

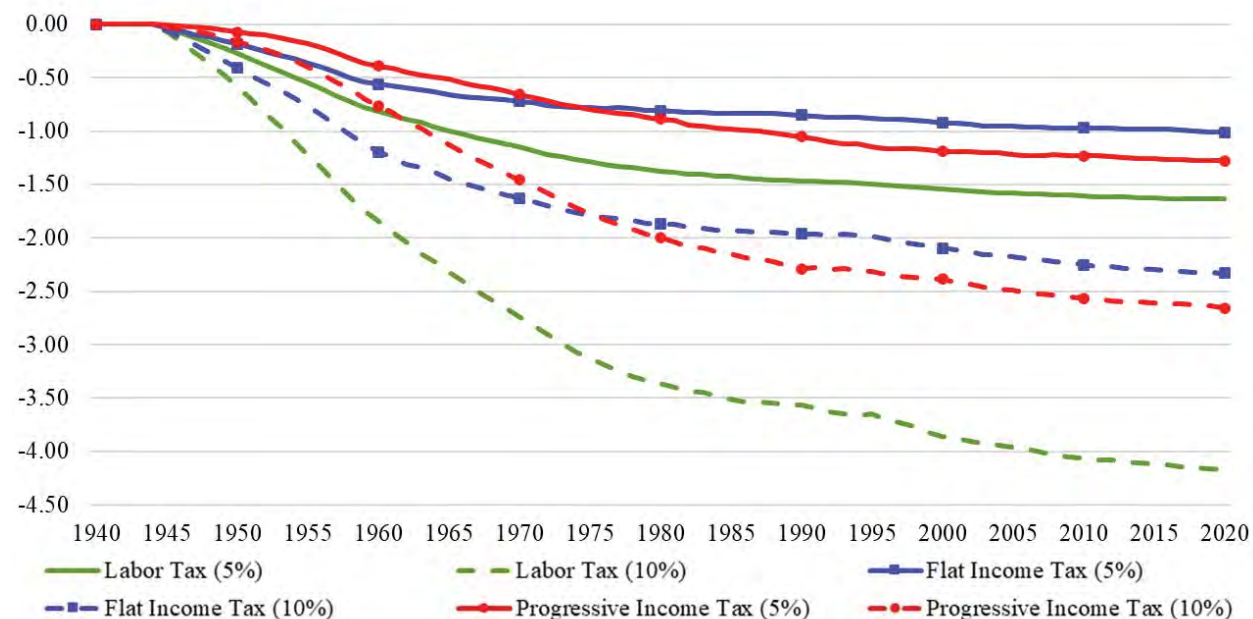


Data source: Congressional Budget Office.

Average real lifetime consumption is computed by summing realized consumption over households' lifetimes within a given birth cohort and taking the population-weighted average of those outcomes.

**Figure 8.**  
**Percentage Change in Average Lifetime Hours Worked, by Cohort Birth Year Relative to the Benchmark Economy**

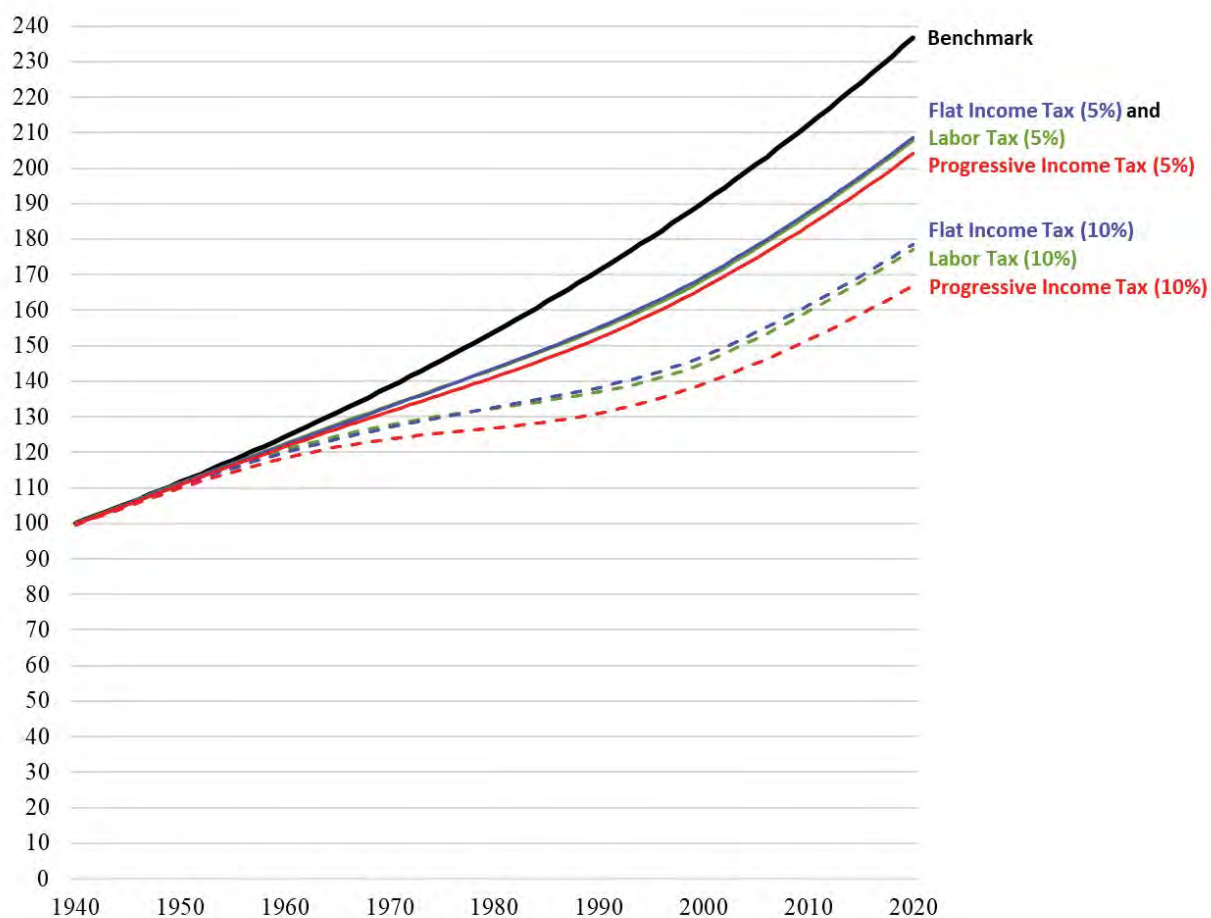
Percent



Data source: Congressional Budget Office.

Average lifetime hours worked is computed by summing realized hours worked over households' lifetimes within a given birth cohort and taking the population-weighted average of those outcomes.

**Figure 9.**  
**Indexed Average Lifetime Real Consumption, by Birth Cohort**



Data source: Congressional Budget Office.

Average real lifetime consumption is computed by summing realized consumption over households' lifetimes within a given birth cohort and taking the population-weighted average of those outcomes. The figure depicts the level of consumption over time, indexed to 100 for the 1940 birth cohort, accounting for the growth rate of the economy.

# Tables

**Table 1.**  
**Average Tax Rates**  
Percent

<b>Average Labor Income Tax Rates</b>	<b>2020</b>	<b>2022</b>	<b>2024</b>	<b>2026</b>	<b>2028</b>	<b>2030</b>
Benchmark	17.7	17.7	17.7	17.7	17.7	17.7
Flat Labor Tax (5%)	17.7	26.6	26.9	27.1	27.3	27.5
Flat Income Tax (5%)	17.7	24.6	24.8	24.9	25.1	25.2
Progressive Income Tax (5%)	17.7	23.4	23.5	23.6	23.8	23.9
Flat Labor Tax (10%)	17.7	35.9	36.5	37.1	37.7	38.4
Flat Income Tax (10%)	17.7	31.7	32.0	32.4	32.7	33.2
Progressive Income Tax (10%)	17.7	29.3	29.5	29.8	30.1	30.4
<b>Average Capital Income Tax Rates</b>	<b>2020</b>	<b>2022</b>	<b>2024</b>	<b>2026</b>	<b>2028</b>	<b>2030</b>
Benchmark	15.4	15.4	15.4	15.4	15.4	15.4
Flat Labor Tax (5%)	15.4	15.4	15.4	15.4	15.4	15.4
Flat Income Tax (5%)	15.4	22.2	22.4	22.6	22.8	22.9
Progressive Income Tax (5%)	15.4	27.4	27.9	28.3	28.7	29.1
Flat Labor Tax (10%)	15.4	15.4	15.4	15.4	15.4	15.4
Flat Income Tax (10%)	15.4	29.3	29.7	30.1	30.5	30.9
Progressive Income Tax (10%)	15.4	40.7	41.7	42.9	44.0	45.4

Data source: Congressional Budget Office.

Tax policy is calibrated to current law rates in 2020 and held constant over time in the benchmark economy.

**Table 2.****Macroeconomic Effects of Raising Government Revenues Relative to the Benchmark Simulation**

Percent/Percentage Points

	5 Percent Increase in Spending			10 Percent Increase in Spending		
	2021	2025	2030	2021	2025	2030
	<b>GDP</b>					
Labor Tax	-0.9	-1.9	-3.2	-2.0	-4.3	-7.2
Flat Income Tax	-0.4	-1.6	-3.0	-1.0	-3.5	-6.3
Progressive Income Tax	-1.0	-2.7	-4.5	-2.5	-5.8	-10.1
	<b>Capital Stock</b>					
Labor Tax	0.0	-2.5	-5.2	0.0	-5.2	-11.1
Flat Income Tax	0.0	-2.8	-5.8	0.0	-5.6	-11.7
Progressive Income Tax	0.0	-3.7	-7.7	0.0	-7.5	-16.1
	<b>Labor</b>					
Labor Tax	-1.5	-1.5	-1.7	-3.3	-3.7	-4.3
Flat Income Tax	-0.8	-0.8	-0.9	-1.7	-1.9	-2.2
Progressive Income Tax	-1.8	-1.9	-2.2	-4.2	-4.6	-5.5
	<b>Private Consumption</b>					
Labor Tax	-6.7	-7.9	-9.1	-13.7	-16.1	-18.9
Flat Income Tax	-5.7	-7.0	-8.3	-11.7	-14.2	-16.9
Progressive Income Tax	-5.4	-7.1	-8.9	-11.6	-14.7	-18.6
	<b>Government Outlays</b>					
Labor Tax	27.3	30.4	27.3	54.5	60.7	54.7
Flat Income Tax	27.5	30.7	27.7	54.9	61.4	55.5
Progressive Income Tax	27.2	30.7	27.9	54.3	61.2	55.9
	<b>After-Tax Wage Rate</b>					
Labor Tax	-10.2	-11.7	-13.3	-20.8	-23.8	-27.4
Flat Income Tax	-8.1	-9.6	-11.3	-16.3	-19.5	-23.3
Progressive Income Tax	-6.2	-7.9	-9.8	-12.4	-15.6	-19.5
	<b>After-Tax Rate of Return on Private Wealth<sup>a</sup></b>					
Labor Tax	-0.1	0.1	0.2	-0.2	0.1	0.4
Flat Income Tax	-0.4	-0.2	-0.1	-0.7	-0.5	-0.2
Progressive Income Tax	-0.6	-0.5	-0.3	-1.3	-1.1	-0.9

Data source: Congressional Budget Office.

The average after-tax wage rate is computed by dividing gross labor income, less taxes paid on labor income, by the total amount of labor supplied. The average after-tax rate of return on private wealth is computed by dividing gross asset income, less taxes paid on asset income, by the total amount of private wealth held by domestic households.

GDP = gross domestic product.

<sup>a</sup> Numbers are percentage-point deviations.

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**Table 3.**  
**Average Change in Lifetime Consumption, by Birth Cohort and Financing Mechanism**  
Percent

<b>Birth Years</b>	<b>Labor Tax (5%)</b>	<b>Flat Income Tax (5%)</b>	<b>Progressive Income Tax (5%)</b>
<b>1940-1959</b>	-0.3	-0.6	-0.9
<b>1969-1979</b>	-3.8	-4.0	-5.0
<b>1980-1999</b>	-9.4	-9.1	-10.8
<b>2000-2019</b>	-11.9	-11.6	-13.3
<b>Birth Years</b>	<b>Labor Tax (10%)</b>	<b>Flat Income Tax (10%)</b>	<b>Progressive Income Tax (10%)</b>
<b>1940-1959</b>	-0.7	-1.2	-1.9
<b>1969-1979</b>	-7.8	-8.3	-10.7
<b>1980-1999</b>	-19.5	-18.8	-22.9
<b>2000-2019</b>	-24.7	-23.8	-28.4

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Data source: Congressional Budget Office.

Average real lifetime consumption is computed by summing realized consumption over households' lifetimes within a given birth cohort and taking the population-weighted average of those outcomes. The table contains those values relative to those from the benchmark simulation.



**Table 4: Average Change in Lifetime Consumption, by Birth Cohort, Income Level, and Financing Mechanism**

Percent

Birth Years	Labor Tax (5%)			Flat Income Tax (5%)			Progressive Income Tax (5%)		
	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third
1940-1959	-0.1	-0.3	-0.4	-0.5	-0.6	-0.7	-0.6	-0.7	-1.0
1969-1979	-2.7	-4.0	-4.1	-3.2	-4.1	-4.2	-2.4	-3.9	-5.8
1980-1999	-8.1	-9.8	-9.8	-8.2	-9.4	-9.3	-6.0	-8.8	-12.2
2000-2019	-10.6	-12.5	-12.2	-10.7	-12.0	-11.7	-8.0	-11.1	-14.8
Birth Years	Labor Tax (10%)			Flat Income Tax (10%)			Progressive Income Tax (10%)		
	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third
1940-1959	-0.1	-0.7	-0.8	-1.0	-1.2	-1.4	-1.4	-1.7	-2.2
1969-1979	-5.1	-8.0	-8.5	-6.5	-8.5	-8.6	-5.4	-8.5	-12.4
1980-1999	-16.8	-19.9	-20.4	-16.9	-19.1	-19.2	-13.6	-18.6	-25.9
2000-2019	-21.9	-25.5	-25.6	-22.1	-24.5	-24.2	-18.5	-23.6	-31.6

Data source: Congressional Budget Office.

Average real lifetime consumption is computed by summing realized consumption over households' lifetimes within a given birth-cohort and income group and then taking the population-weighted average of those outcomes. This table contains those values relative to those from the benchmark simulation.

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**Table 5.**  
**Average Change in Lifetime Hours Worked, by Birth Cohort and Financing Mechanism**  
Percent

<b>Birth Years</b>	<b>Labor Tax (5%)</b>	<b>Flat Income Tax (5%)</b>	<b>Progressive Income Tax (5%)</b>
<b>1940-1959</b>	-0.3	-0.2	-0.1
<b>1969-1979</b>	-1.1	-0.7	-0.6
<b>1980-1999</b>	-1.5	-0.9	-1.1
<b>2000-2019</b>	-1.6	-1.0	-1.2
<b>Birth Years</b>	<b>Labor Tax (10%)</b>	<b>Flat Income Tax (10%)</b>	<b>Progressive Income Tax (10%)</b>
<b>1940-1959</b>	-0.7	-0.5	-0.2
<b>1969-1979</b>	-2.7	-1.6	-1.4
<b>1980-1999</b>	-3.6	-2.0	-2.2
<b>2000-2019</b>	-4.0	-2.2	-2.5

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Data source: Congressional Budget Office.

Average lifetime hours worked is computed by summing realized hours worked over households' lifetimes within a given birth cohort and taking the population-weighted average of those outcomes. The table contains those values relative to those from the benchmark simulation.

**Table 6: Average Change in Lifetime Hours Worked, by Birth Cohort, Income Level, and Financing Mechanism**

Percent

Birth Years	Labor Tax (5%)			Flat Income Tax (5%)			Progressive Income Tax (5%)		
	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third
1940-1959	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	0.1	-0.1	-0.3
1969-1979	-1.2	-1.3	-0.9	-0.9	-0.8	-0.5	-0.2	-0.7	-1.1
1980-1999	-1.5	-1.8	-1.1	-1.0	-1.2	-0.5	-0.2	-1.4	-1.4
2000-2019	-1.8	-2.0	-1.1	-1.2	-1.4	-0.4	-0.4	-1.8	-1.4
Birth Years	Labor Tax (10%)			Flat Income Tax (10%)			Progressive Income Tax (10%)		
	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third	Bottom Third	Middle Third	Upper Third
1940-1959	-0.9	-0.7	-0.6	-0.6	-0.4	-0.4	0.2	-0.3	-0.6
1969-1979	-2.9	-2.9	-2.4	-1.9	-1.7	-1.3	-0.4	-1.3	-2.5
1980-1999	-3.6	-4.1	-3.0	-2.2	-2.5	-1.3	-0.2	-2.8	-3.5
2000-2019	-4.5	-4.7	-3.1	-2.7	-3.0	-1.1	-0.6	-3.3	-3.5

Data source: Congressional Budget Office.

Average lifetime hours worked is computed by summing realized hours worked over households' lifetimes within a given birth cohort and income group and then calculating the population-weighted average of those outcomes. The table contains those values relative to those from the benchmark simulation.

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