



# Congressional Budget Office

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## Long-Term Analysis of Fiscal Policy at CBO

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For additional information, see Congressional Budget Office, “Economic Effects of Fiscal Policy,”  
[www.cbo.gov/topics/economy/economic-effects-fiscal-policy](http://www.cbo.gov/topics/economy/economic-effects-fiscal-policy)

# Overview

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- CBO's approach to analyzing the long-term effects of fiscal policy
- An illustrative example: CBO's analysis of the President's 2016 Budget

# **Analyzing the Long-Term Effects of Fiscal Policy**

# CBO's Approach

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- Short term: Changes in fiscal policies affect the overall economy primarily by influencing the demand for goods and services by consumers, businesses, and governments, which leads to changes in output relative to potential (maximum sustainable) output.
- Long term: Changes in fiscal policies affect output primarily by altering national saving, foreign investment in the U.S., federal investment, and people's incentives to work and save, as well as businesses' incentives to invest, thereby changing potential output.

# Long-Term Effects

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- CBO uses two models of potential output to estimate the effects of changes in fiscal policies on the overall economy over the long term.
  - Solow-type growth model
  - Life-cycle growth model
- Potential output depends on:
  - Amount and quality of labor and capital (which depend on work, saving, and investment)
  - Productivity of the labor and capital inputs (which depends in part on federal investment)
  - Amount of national saving (which depends in part on federal borrowing)

# The Role of Expectations About Fiscal Policy: Solow-Type Growth Model

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- People base their decisions about working and saving primarily on current economic conditions, including government policies.
- Decisions reflect people's anticipation of future policies in a general way but not their responses to specific future developments.

# The Role of Expectations About Fiscal Policy: Life-Cycle Growth Model

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- People make choices about working and saving in response to both current economic conditions and their explicit expectations of future economic conditions.
- The model requires specification of future fiscal policies that put federal debt on a sustainable path over the long run.
- If debt as a percentage of GDP were to rise without limit, eventually there would not be sufficient resources to finance the debt.

# Estimated Effects on the Aggregate Economy

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- Generally, CBO focuses on effects on gross national product (GNP) instead of the more commonly cited gross domestic product (GDP).
- GNP is the total market value of goods and services produced in a given period by the labor and capital supplied by a country's residents, regardless of where the labor and capital are located.
- GNP excludes foreigners' earnings on domestic investments and includes domestic residents' foreign earnings.
- In a large, open economy like that of the United States, changes in GNP are a better measure of changes in domestic residents' income than are changes in GDP.

# Central Estimates and Ranges

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- CBO's estimates of those effects are based on parameters such as the extent to which national saving is altered by changes in fiscal policies.
- In most cases, CBO estimates the economic effects (and feedback to the budget) using a range of parameter estimates reflecting the consensus in the economic literature.
- To arrive at its central estimate of the economic effects, CBO uses the central estimates for those parameters.

# Uncertainty in Budgetary Outcomes

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- When practicable and informative, CBO will report the estimated range of budgetary outcomes owing to the uncertainty of macroeconomic effects.
- CBO needs to consider the uncertainty regarding feedback in the context of its ability to quantify the uncertainty of the conventional cost estimate.
- CBO will report the range of Solow-type growth model estimates.
  - Differences between Solow-type growth model results and those of the life-cycle growth model reflect model uncertainty in addition to parameter uncertainty, making interpretation difficult.

# Uncertainty in Budgetary Outcomes (Continued)

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- The likelihood that all parameters would simultaneously be at the ends of their ranges is smaller than the likelihood that any single parameter would be at the end of its range.
  - CBO focuses on uncertainty about the two parameters that have the largest budgetary effects.
  - CBO examines estimates resulting from cases in which two parameters are at the ends of their ranges and other parameters are equal to central estimates.
- CBO will report cases that show the most favorable and least favorable budgetary outcomes.

# How Labor Supply Responds to Changes in Fiscal Policy in the Solow-Type Growth Model

- The overall effects of a policy change on the labor supply can be expressed as an elasticity, which is the percentage change in the labor supply resulting from a 1 percent change in after-tax income.
- Substitution effect: Increased after-tax compensation for an additional hour of work makes work more valuable relative to other uses of a person's time.
- Income effect: Increased after-tax income from a given amount of work allows people to maintain the same standard of living while working fewer hours.

# How Labor Supply Responds to Changes in Fiscal Policy in the Solow-Type Growth Model (Continued)

- CBO's central estimate corresponds to an earnings-weighted total wage elasticity for all earners of 0.19 (composed of a substitution elasticity of 0.24 and an income elasticity of -0.05).
- For some proposals, income and substitution effects may not offset each other (for example, if the proposal would increase after-tax wages but reduce income).
- CBO estimates that the substitution elasticity with a range from a low estimate of about 0.16 to a high estimate of about 0.32; the income elasticity could range from about -0.10 to about 0.

# Other Key Aspects of the Solow-Type Growth Model

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- When the deficit increases by one dollar, private saving is estimated to rise by 43 cents (national saving falls by 57 cents), and net capital inflows rise by 24 cents, ultimately leaving a decline of 33 cents in investment.
  - Range of estimates: The decline in investment ranges from 15 cents to 50 cents.
- Additional federal investment is estimated to yield half of the typical return on investment completed by the private sector.
  - The range of estimates goes from no return on investment to the typical return on investment completed by the private sector.

# Key Aspects of the Life-Cycle Growth Model

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- The model includes different cohorts of households, also known as “overlapping generations.”
- Model requires people’s explicit expectations about how fiscal policy and the economy will evolve.
- People are assumed to know, with certainty, the paths of aggregate outcomes, such as after-tax rates of return.
- Paths of a particular household’s after-tax wages (and thus its Social Security benefits) are uncertain.

# Uncertainty in the Life-Cycle Growth Model

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- People face idiosyncratic uncertainty about their own future income.
- People have an uncertain lifespan.
- Because of that uncertainty, households in the life-cycle growth model take the precaution of holding additional savings as a buffer against potential drops in income or the need for resources in retirement over the course of an unusually long life.

# Other Key Aspects of the Life-Cycle Growth Model

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- Labor supply and private saving are influenced by the current values and future anticipated values of the after-tax rate of return on saving, the after-tax wage, and households' disposable income, among other factors.
- The elasticity with respect to a one-time temporary change in wages (the so-called Frisch elasticity) is 0.40, according to CBO's central estimates, with a range from 0.27 to 0.53.
  - Frisch elasticity and CBO's estimate of the total wage elasticity are chosen to be consistent with each other.

## Other Key Aspects of the Life-Cycle Growth Model (Continued)

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- People decide how much to work and save to make themselves as well off as possible over their lifetime but do not consider the well-being of their children.
- Without altruism, a household's responsiveness to a policy change depends on the age of its members.
- Older generations are constrained in how they can adjust to policy changes.
- If the people forming a household die with wealth, in the model that wealth is uniformly distributed to working-age households. The size of that aggregate transfer is predictable.

# Range of Estimates Within the Life-Cycle Growth Model

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- To consider a broad range of possibilities about net capital inflows, CBO analyzes the effects of fiscal policy changes under two alternative assumptions.
- First, net capital inflows are unaffected by changes in fiscal policies (equivalently, that the country has, in effect, a so-called closed economy).
- Second, net capital inflows change by the full amount necessary to offset any effect of changes in fiscal policies on interest rates (equivalently, that the country has, in effect, a so-called small, open economy).

# Range of Estimates Within the Life-Cycle Growth Model (Continued)

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- Because the model is forward-looking, it requires offsetting policy changes that eventually stabilize government debt (closure rules); CBO assumes that, beginning in 15 years, those policies would be phased in over 10 years.
- CBO models two sets of assumptions:
  - Reduced spending (half from government purchases and half from transfers), or
  - Increased taxes (half from marginal rate changes and half in lump-sum amounts)
- The results from both closure rules are reported, and results generally are similar.

# **Analysis of the President's 2016 Budget**

# An Illustrative Example: Preliminary Analysis

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- Each year, after the President releases his budget request, CBO analyzes the proposals in that request.
- First, CBO projects what the federal budget would look like if the President's proposals were adopted, holding the aggregate economy unchanged.
- Second, CBO shows the effects that the proposals would have on the economy and how those macroeconomic effects would, in turn, affect the budget.

# CBO's Conventional Analysis

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- Because the President's 2016 proposals would significantly change immigration policy and would significantly increase the size of the U.S. labor force, the first step of the analysis incorporated the estimated direct effects on the U.S. population, employment, and taxable compensation.
- With those effects CBO and the staff of the Joint Committee on Taxation estimated that deficits under the President's proposals would be \$1.4 trillion less during the 2016–2025 period than in CBO's March 2015 baseline, adjusted for subsequently enacted legislation.

# Policies in the President's Budget With Important Economic Effects

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- Enact comprehensive immigration reform.
- Limit the extent to which certain deductions and exclusions would reduce tax liability.
- Increase taxes on capital gains and dividends.
- Increase spending for surface transportation programs and funding for education and training.

# If Enacted, the Policies Proposed Would Affect the Economy in Six Main Ways

- Increase the size of the U.S. population, thus expanding the labor force and boosting productivity, and also increasing interest rates
- Reduce federal deficits in the short term—mainly through higher tax revenues—which would reduce aggregate demand
- Reduce federal budget deficits in the long term, which would increase national saving and private investment
- Raise the marginal tax rate on labor income, on net, thereby discouraging work
- Raise the marginal tax rate on capital income, thereby discouraging saving
- Increase federal investment in ways that would increase productivity and the skill level of the workforce

# Estimated Effects of the President's Budget on Real GNP

Percentage Difference From CBO's Baseline

	2016–2020	2021–2025
Central estimate	0.4	1.7
Range	0.2 to 0.5	1.1 to 2.3

To construct the range for gross national product (GNP), CBO identified the cases that resulted in the most favorable and least favorable budgetary outcomes in which two parameters were equal to the ends of their ranges and other model parameters were equal to their central estimates.

# CBO's Estimates of How the President's Budget Would Affect GNP Under Various Models and Estimating Approaches, 2021 to 2025

Average Percentage Difference From CBO's Baseline, by Calendar Year

	Weak Effects of Immigration on Productivity	Strong Effects of Immigration on Productivity
Solow-Type Model		
Weak Effect of Deficits on Investment		
Weak labor supply response	1.4	2.4
Strong labor supply response	1.1	2.3
Strong Effect of Deficits on Investment		
Weak labor supply response	1.3	2.3
Strong labor supply response	1	2.2
Life-Cycle Model		
Federal Debt Stabilized by Reducing Government Spending After 2030		
Interest rates determined by the domestic economy	0.9	2
Interest rates determined by the world economy	0.8	2.2
Federal Debt Stabilized by Increasing Tax Revenues After 2030		
Interest rates determined by the domestic economy	0.8	1.9
Interest rates determined by the world economy	0.7	2.1

# Projected Five-Year Deficits Under CBO's March 2015 Baseline and Under CBO's Estimate of the President's Budget

Trillions of Dollars, by Fiscal Year

	2016–2020	2021–2025
Total Deficit Under CBO's March 2015 Baseline (Adjusted for subsequent legislation)	-2.8	-4.6
Total Deficit Under CBO's Estimate of the President's Budget		
With some macroeconomic feedback from the President's immigration proposal	-2.3	-3.7
With macroeconomic feedback from all of the proposals in the President's budget	-2.4	-3.6