

**MACROECONOMIC ANALYSIS OF A PERMANENT
CHILD TAX CREDIT EXPANSION**

Prepared by the Staff
of the
JOINT COMMITTEE ON TAXATION

October 2022

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This report, prepared by the staff of the Joint Committee on Taxation (“Joint Committee staff”), provides an analysis of the macroeconomic effects of a proposal to extend and make permanent the modifications to the Child Tax Credit (“CTC”) under H.R. 1319, the “American Rescue Plan (“ARP”) Act of 2021,” beginning in calendar year 2023. The basis for this analysis is the conventional revenue effect resulting from this policy change, which the Joint Committee staff estimates to be a reduction in Federal revenues by \$1,254 billion over the 10-year budget window for fiscal years 2023-2032.

The Joint Committee staff estimates that the enactment of this policy would decrease the average annual growth rate of real gross domestic product (“GDP”) by 0.04 percentage points, from 1.76 percent in the present-law baseline to 1.72 percent, over the 2023-2032 budget window. After accounting for macroeconomic effects, the Joint Committee staff estimates that the proposal would reduce Federal revenues by an additional \$113 billion, or \$1,367 billion in total, relative to present law, by the end of the budget window.

Because the macroeconomic models used have been developed with an emphasis on tax policy, some outcomes of public policy decisions are not modeled. For example, this ignores potential human capital losses from parents leaving the workforce and any potential long-run benefits from a reduction in child poverty.¹

Present law

The CTC generally allows taxpayers to reduce their tax liability by \$2,000 per qualifying child through calendar year 2025, and \$1,000 per qualifying child beginning in calendar year 2026.² For calendar years 2023-2025, the CTC begins to phase out with adjusted gross income (“AGI”) in excess of \$200,000 (\$400,000 for married taxpayers filing jointly). For calendar

¹ Some of the research on policies that potentially affect parental labor supply, childhood poverty rates and health, and long run income effects include:

Anderson, Deborah J., Melissa Binder, and Kate Krause. “The Motherhood Wage Penalty: Which Mothers Pay It and Why?”. *American Economic Review*, 92, no. 2 (2002): 354-358.

Bastian, Jacob, and Katherine Micheltore. "The Long-term Impact of the Earned Income Tax Credit on Children's Education and Employment Outcomes." *Journal of Labor Economics* 36, no. 4 (2018): 1127-1163.

Crandall-Hollick, Margot L. and Joseph S. Hughes, Congressional Research Service, *The Earned Income Tax Credit (EITC): An Economic Analysis (Report R44057)*, August 13, 2018, available at <https://crsreports.congress.gov/product/pdf/R/R44057>.

Dench, Daniel, and Theodore Joyce. "The Earned Income Tax Credit and Infant Health Revisited." *Health Economics* 29, no. 1 (2020): 72-84.

Froemel, Maren, and Charles Gottlieb. "The Earned Income Tax Credit: Targeting the Poor but Crowding Out Wealth." *Canadian Journal of Economics* 54, no. 1 (2021): 193-227.

² For purposes of the CTC a qualifying child is under the age of 17. A child older than 16 years-old may only qualify for the Other Dependent Credit worth up to \$500.

years beginning after 2025, these phase-out thresholds are \$75,000 and \$110,000 respectively. The CTC is generally phased out at a rate of \$50 for every \$1,000 of AGI in excess of the thresholds.

Taxpayers whose tax liability is brought to zero from the CTC as described above may be eligible to receive the unused portion as a refundable credit. For calendar years 2023-2025, the refundable portion of the CTC phases in at a rate of \$0.15 for every \$1 of earned income in excess of \$2,500. For calendar years beginning after 2025, the CTC phases in at the same rate of earned income in excess of \$3,000. The maximum refundable amount for calendar years 2023-2025 is the smaller of an indexed \$1,400³ per qualifying child or the unused portion of the CTC. The maximum refundable amount for calendar years beginning after 2025 is the smaller of \$1,000 per qualifying child or the unused portion of the CTC.

Description of Proposal

The proposal permanently increases the credit amount of the CTC to \$3,000 per qualifying child, with an extra \$600 for qualifying children under the age of six. The AGI phaseout thresholds for the expanded credit are \$75,000 for single taxpayers, \$112,000 for head of household taxpayers and \$150,000 for married taxpayers filing jointly. In addition, the proposal eliminates the earned-income requirement and phase-in for the refundable portion of the CTC and allows for up to 100 percent of the credit to be refunded regardless of income. Finally, the definition of qualifying child for purposes of the CTC is expanded to include 17-year-olds.

The Joint Committee staff estimates that, under the proposal, the effective marginal tax rate on earned income for lower-income taxpayers with earnings below \$50,000 (in 2022 dollars) increases by about 0.4 percentage points on average over the budget window. This occurs because the phase-in is eliminated with the removal of both the earned income requirement and the \$1,400 (indexed) refundability limitation. Under present law, a taxpayer that was receiving less than the maximum refundable credit amount could increase their credit by increasing labor hours and earned income. Under the proposal, that taxpayer receives the full amount of the credit regardless of labor choice. Because the proposal also increases the amount of the credit per qualifying child, the average tax rate on the earned income of lower-income taxpayers is estimated to fall by about 2.7 percentage points on average over the 2023-32 budget window.

The effective marginal rate on earned income for higher-income taxpayers with earnings above \$50,000 (in 2022 dollars) is estimated to increase by about 0.3 percentage points on average over the budget window. This is due to the expansion of the phase-out region of the credit. If a taxpayer was fully phased-out of the credit under present law, increasing their labor hours and income would not affect the credit amount. An expansion of the phase-out region of the credit increases the number of households who experience a reduction in the credit amount as their income increases, causing them to face a higher effective marginal tax rate on income. The average tax rate for higher-income households on their earned income is estimated to fall by

³ \$1,400 is the value of the limit for 2018. This limit is indexed to inflation.

about 0.4 percentage points on average over the same period because the proposal increases the amount of the credit per qualifying child.

EFFECTS ON ECONOMIC ACTIVITY AND REVENUES

The estimates of the effect of this proposal on economic activity and revenues were produced using a weighted average of those effects generated by the Joint Committee staff's Macroeconomic Equilibrium Growth Model ("MEG")⁴ and Overlapping Generations Model ("OLG")⁵. As described in the Appendix, each model provides a somewhat different perspective on savings/investment and labor supply responses. In the MEG model, households have myopic foresight and do not anticipate long-run changes to Federal debt or the productive capital stock. In the OLG model, households can foresee that growing Federal debt will crowd out private capital, and that less private capital will negatively affect wages. As a result of the different assumptions about the extent of household foresight, households in the OLG model are more likely to intertemporally substitute consumption and labor supply across time.

To determine weighted average effects, the OLG model was assigned a weight of 0.5, and the MEG model a weight of 0.5. The OLG and MEG models were given the same weight since both model the policy incentives well and capture important behavioral responses. The MEG model features monetary policy conducted by the Federal Reserve Board, with delayed price and wage adjustments to changes in economic conditions allowing for the economy to be temporarily out of equilibrium in response to fiscal and monetary policy. The OLG model features substantial household heterogeneity, which captures in an explicit fashion how households of different family compositions and ages can respond differently to a given policy change.

The effects on macroeconomic aggregates discussed below are also summarized in Table 1, at the end of the section.

Effects on output

The Joint Committee staff estimates that the proposal will decrease the level of GDP, relative to the baseline forecast, by about 0.2 percent on average throughout the 10-year budget window. In general, tax policy can affect the size of the economy by changing incentives for individuals to supply labor, save and consume, as well as firm incentives to invest. Changes in tax policy can alter the after-tax rate of return to these activities, both directly through tax rates,

⁴ A detailed description of the MEG model may be found in Joint Committee on Taxation, *Macroeconomic Analysis of Various Proposals to Provide \$500 Billion in Tax Relief* (JCX-4-05), March 1, 2005, and Joint Committee on Taxation, *Overview of the Work of the Staff of the Joint Committee on Taxation to Model the Macroeconomic Effects of Proposes Tax Legislation to Comply with House Rule XIII(h)(2)* (JCX-105-03), December 22, 2003.

⁵ A detailed description of the OLG model may be found in "Macroeconomic Implications of Modeling the Internal Revenue Code in a Heterogeneous-Agent Framework," *Economic Modelling*, vol. 87, April 2020, pp. 72-91, in Rachel Moore and Brandon Pecoraro, "A Tale of Two Bases: Progressive Income Taxation of Capital and Labor Income," *Public Finance Review*, vol. 49, no. 3, May 2021, pp. 335-391, and in Joint Committee on Taxation, *An Overview of a New Overlapping Generations Model with an Example Application in Policy Analysis* (JCX-22R-20), October 22, 2020.

or indirectly through behavioral and price changes. Aggregate demand can also be affected by changes to tax policy that affect overall after-tax income.

For this proposal, the projected decrease in GDP results primarily from a reduction in aggregate labor supply and capital, relative to baseline. Aggregate labor supply falls primarily due to a positive income effect from the increase in the value of the credit, and a negative substitution effect from the reduction in the after-tax marginal return to labor. When households have more disposable income, they can increase both leisure and consumption at the expense of labor supply. In addition, households that were on the phase-in region of the CTC under present law that is eliminated under the proposal can no longer increase their credit amount with additional labor hours, so the net rate of return to labor falls, making leisure relatively more attractive. Because a reduction in aggregate labor supply reduces the marginal productivity of capital, firms reduce their rate of investment. While the increase in disposable income allows for households to increase consumption in the aggregate, the positive effect that this has on aggregate output is more than fully offset by the negative effect associated with a reduction in aggregate labor supply and capital investment relative to baseline projections.

While the estimated decrease in output relative to the baseline is small on average over the first half of the budget window at 0.1 percent, slowing capital accumulation increasingly slows GDP growth. Therefore, GDP is estimated to be around 0.3 percent lower than the baseline level on average over the second half of the budget window.

Effects on labor supply

The proposal decreases the after-tax rate of return to labor for households that were in the phase-in region of the CTC under present law, and those that are in the new phase-out region created by the proposal. The former has a relatively large disincentive on labor supply for relevant taxpayers because the additional credit amount received per additional dollar of earned income along the phase-in region decreases from \$0.15 under present law to \$0.00 under the proposal.⁶ The proposal also discourages labor supply by increasing the disposable income for households who are not phased-out of the CTC.

While the projected decline in labor supply increases the market wage rate in the first half of the budget window, the larger reduction in the rate of capital accumulation over the second half of the budget window causes the market wage rate to fall below baseline projections. Despite this wage trajectory, labor supply falls by less in the second half of the budget window for two reasons. First, labor supply is projected to fall under baseline projections after 2025 due to increasing tax rates under present law.⁷ Thus, many households that are marginally attached to the workforce are projected to have already decreased labor supply under baseline after 2025, making further declines from the CTC expansion less likely. Second, the slowing rate of capital

⁶ For households with AGI along phase-out regions created by the proposal, the amount of credit lost is \$50 per additional \$1,000 of AGI.

⁷ See JCX-1-22, *List of Expiring Federal Tax Provisions 2021-2031*.

accumulation causes the price of capital relative to labor to increase, which encourages firms to substitute more labor for capital in the production process.

Overall, effective labor supply⁸ is estimated by the Joint Committee staff to fall by 0.2 and 0.1 percent on average over the first and second halves of the budget window, and by 0.2 percent on average over the budget window, relative to baseline.

Effects on capital stock

The proposal does not directly affect the after-tax rate of return to capital, but it does so indirectly through three main channels. First, by encouraging consumption at the expense of saving, there are fewer resources available for investment in productive capital. Second, by discouraging household labor supply, the marginal productivity of capital declines and lowers the rate of return on productive capital, which also discourages investment. The reduction in the rate of capital accumulation intensifies relative to baseline over time, as firms substitute labor for capital in the production process. Third, because deficits increase, the demand for government borrowing increases, driving up interest rates and crowding out investment. Relative to the present-law baseline, the stock of productive capital is projected to decrease by about 0.1 percent and 0.6 percent over the first and second halves of the budget window, averaging to a decrease of 0.4 percent over the entire period.

Effects on consumption

The proposal generates a large increase in consumption due to the positive income effect created by the reduction in average tax liability due to the increased CTC. Although reductions in labor supply and earned income reduce disposable income, the increase in disposable income allowed for by a permanently larger credit dominates in its effect on consumption. The Joint Committee staff estimates that consumption increases by 0.2 percent on average over both the first and second halves of the budget window.

Long-run economic effects

While the conventional revenue estimate is expected to remain negative beyond the budget window, the revenue cost does shrink over time since the credit amount and phase-out thresholds are not indexed to inflation. The Joint Committee staff estimates that this will dampen the negative labor supply and the positive consumption effects over time. However, since this policy accumulates additional Federal debt over time, the crowding-out effect on private capital grows over time. For this reason, the Joint Committee staff estimates that long-run GDP will be below its baseline level.

⁸ Effective labor supply is aggregate productivity-weighted equilibrium labor employed.

Budgetary effects

The reduced growth estimated by the Joint Committee staff as a result of the proposal is projected to increase revenue loss over the conventionally estimated revenue loss by \$113.2 billion over the 2023-2032 budget window. Details of the estimate are in Table 2.

Macroeconomic revenue feedback for the proposal is negative because the policy discourages labor supply and capital investment, shrinking the amount of taxable income that comprise major sources of Federal revenue.

Table 1. Percent Change in Economic Outcomes Relative to Present Law			
	<u>2023-27</u>	<u>2028-32</u>	<u>2023-32</u>
Output	-0.1%	-0.3%	-0.2%
Business Capital	-0.1%	-0.6%	-0.4%
Labor	-0.2%	-0.1%	-0.2%
Consumption	0.2%	0.2%	0.2%

Table 2. Projected Budgetary Effects of the Proposal			
<i>Fiscal Year, billions of dollars</i>	<u>2023-27</u>	<u>2028-32</u>	<u>2023-32</u>
Conventional Revenue Estimate	-543.2	-710.6	-1,253.8
Macroeconomic Revenue Feedback	-26.4	-86.8	-113.2
Total Change to Revenue	-569.6	-797.4	-1,367.0

APPENDIX: DATA, MODELS, AND ASSUMPTIONS USED IN THE ANALYSIS

The Joint Committee staff analyzed the proposal using the Joint Committee staff MEG and OLG models. While the models are based on economic data from the National Income and Product Accounts, taxable income in the models is adjusted to reflect taxable income as measured and reported on tax returns. Both models start with the standard, neoclassical production framework in which the amount of output is determined by the quantity of labor and capital used by firms, and the productivity of those factors of production. Both individuals and firms are assumed to make decisions based on observed characteristics of the economy, including wages, prices, interest rates, tax rates, and government spending levels. In particular, labor supply is determined by individuals' preferences, expectations, and after-tax returns to working, which depend on wage (payroll) rates as well as average and marginal tax rates. Similarly, the capital stock is determined by investors' expectations (or knowledge if perfect foresight) of after-tax returns to capital, which depend on anticipated gross receipts, costs of factor inputs, and tax rates that affect those factors. The underlying structure of the MEG model relies more on reduced-form behavioral response equations, while the OLG model is built on theoretical microeconomic foundations.

The degree to which the Joint Committee staff relies more heavily on the results of one model versus the other depends on the specifics of the proposal being analyzed and the strengths of each model. The MEG model, which does not require a fiscal balance assumption, is better suited to analyze proposals that produce large, conventionally estimated deficits or surpluses. This model aggregates four separate types of labor, using separate marginal and average tax rates for all major individual and business income tax sources. The availability of investment capital to firms is determined by individuals' savings response to changes in the after-tax rate of return on investment as well as by foreign capital flows. Also in the MEG model, monetary policy conducted by the Federal Reserve Board is explicitly modeled, with delayed price adjustments in response to changes in fiscal and monetary policy allowing for the economy to be temporarily out of equilibrium. The myopic expectation framework in the MEG model represents the extreme case of the degree of foresight individuals have about future economic conditions, in which individuals assume in each period that current economic conditions will persist permanently.

At the other end of the foresight spectrum, in the OLG model, individuals are assumed to make consumption, labor supply, and residential decisions to maximize their expected lifetime well-being given the resources they can foresee will be available to them. They are assumed to have complete information, or "perfect foresight," about economic conditions, such as wages, prices, interest rates, tax policy, and government spending, while they have uncertainty over their length of life. The OLG model represents a class of models with "micro-foundations" and life-cycle effects modeled separately for 76 "generations," each with two household types (married or single), eight labor productivity types, and 10 wealth endowment types. Individuals in each household optimally choose their labor supply from a discrete set of options—not in the workforce, part time, or full time. For married households, that labor supply decision is made jointly by primary and secondary earners. This indivisible labor assumption implies that the aggregate labor supply elasticity is endogenous and depends on the distribution of reservation

wages⁹ across households. Tax liability on household income is determined by an internal tax calculator that incorporates key aspects of income tax system under present law and the proposed legislation. The OLG model includes a more differentiated business sector, with distinct corporate and non-corporate entities that produce output at profit maximizing levels using labor, private capital and public capital. The OLG model is a large open-economy model where foreign entities purchase a portion of new debt issued by the Federal government, thereby reducing the crowding-out effect relative to that of a closed-economy model. Although debt may be held abroad, there is no additional income or investment shifting beyond what is estimated conventionally.

In the OLG model, the ability of individuals to foresee changes in fiscal conditions means that the decision-makers in the model will be unable to make optimal economic decisions if they can foresee a permanently unstable economic future, thus preventing the models from “solving” - or completing their simulations. This problem arises in a situation where deficits or surpluses are expected to increase faster than the rate of growth of GDP, which is a characteristic under present law as well as the proposal analyzed here. Thus, it is necessary to make counter-factual “fiscal balance” assumptions about the expected path of debt for these models. In the MEG model, however, individuals are assumed not to foresee that the growing government debt-to-GDP ratio under present law will eventually become so large that it becomes unsustainable, and the model can generate forecasts up until that point.

For models that require a fiscal balance assumption, imposing the fiscal balance outside the budget window can have effects inside the window, because model agents can foresee that it will occur. This “anticipation effect” is stronger the closer in time it is to agents’ present decision making. In recent years, developmental work on the OLG model has allowed the fiscal balance assumption to be made 20 or 30 years after the budget window, thus reducing the effect of this assumption on behavior inside the budget window.¹⁰

The estimate of the impact of the growth effects from this proposal on its budget effects was produced using an average of those effects generated by the MEG and OLG models with 50-50 weights. As described above, each model provides a somewhat different perspective on savings/investment and labor responses. The MEG model allows simulation of the proposal as drafted, with no offsetting fiscal balance assumption. The OLG model provides detailed focus on household heterogeneity and explicit tax policy interactions.

Each major tax bill potentially presents a unique combination of changes in the definition of the taxable base for different sources of income, as well as changes in tax rates on different sources of income. Because the Joint Committee staff uses these models to facilitate analysis of tax policy, and to estimate the revenue consequences of the macroeconomic effects of tax policy, the staff has devoted a considerable amount of time and attention to modeling the specific types of income flows affected by proposals, to the extent allowed by other sets of assumptions within each macroeconomic model. Information about the effects of the proposal on average tax rates

⁹ A reservation wage is the lowest after-tax wage at which an individual is willing to work.

¹⁰ 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.

and effective marginal tax rates on each source of income is obtained from various Joint Committee staff tax models¹¹ (used in the production of conventional revenue estimates) to characterize the effects of the revenue provisions of the bill within the each of the models.

Table 3. Key Parameters in the MEG Model			
Household		Income	Substitution
Labor Supply Elasticities			
	Low-income primary	-0.1	0.2
	Other primary	-0.1	0.1
	Low-income secondary	-0.3	0.8
	Other secondary	-0.2	0.6
	Wage-weighted population average	-0.1	0.2
	Annual rate of time preference	0.015	
	Intertemporal elasticity of substitution	0.350	
Production			
	Business Capital share	0.412	

Table 4. Key Parameters in the OLG Model		
Household		
	Annual rate of time preference	0.060
	Aggregate labor share of time endowment	0.309
	Intratemporal elasticity of substitution (consumption and housing)	0.487
Production		
	Private Capital share	0.353
	Public Capital share	0.078

¹¹ Descriptions of the Joint Committee staff's conventional estimating models may be found in JCX-46-11, *Testimony of the Staff of the Joint Committee on Taxation before the House Committee on Ways and Means Regarding Economic Modeling*, September 21, 2011, JCX-75-15, *Estimating Changes in the Federal Individual Income tax: Description of the Individual Tax Model*, April 24, 2015, and other documents at www.jct.gov under "Estimating Methodology."