A Detailed Macroeconomic Analysis of President Biden's 2020 Campaign Tax Proposals

Jason DeBacker, Richard W. Evans, and Benjamin R. Page

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The following is an exposition of more of the detail of the analysis of tax proposals made during President Biden's 2020 campaign using the Tax Policy Center's (TPC) microsimulation model and the OG-USA macroeconomic model in Page et al. (2021). We use the open-source OG-USA macroeconomic model of U.S. fiscal policy for this analysis. OG-USA has been adjusted to incorporate tax data from the TPC microsimulation model. OG-USA also directly simulates the behavior of firms as well as of households with different earnings abilities. All code for this macroeconomic simulation is available at https://github.com/PSLmodels/OG-USA/tree/TPC_Biden. General documentation for the model is available at
https://pslmodels.github.io/OG-USA/.

The Biden campaign proposals represent a tax increase on the highest income taxpayers and a tax cut on the low and middle income taxpayers. We find that while the policy raises significant revenue, revenue gains are about 20% lower in the first 10 years of the policy than those suggested by a static analysis because of a large behavioral response by high earners. The policy reduces GDP by 0.37% per year, on average, for the first 10 years. However, the revenue increases reduce government debt and, due to the reduced crowding out of private capital, this results in an increase in GDP after 2038. After 20 years, the debt to GDP ratio would be about 20 percentage points lower under the proposed changes in tax policy.

This document is organized in five sections. In Section 1, we outline the tax provisions from the Biden campaign, highlighting those that were modeled and which were not. Section 2 details the interaction between the TPC microsimulation model and OG-USA. Section 3 discusses the calibration of the OG-USA model to match key wealth and income moments, which prove critical to a realistic analysis of these tax proposals. Section 4 summarizes the effects of the tax provisions we model on the economy and the budget. Finally, Section 5 concludes.

1 The Biden Campaign Tax Proposals

The tax policy changes proposal by the Biden campaign are detailed by Mermin et al. (2020). Among the major provisions are:

- Apply Social Security payroll taxes to earnings above $400,000
- Increase taxes on capital gains and dividends for taxpayers with incomes above $1 million
- Repeal TCJA individual income tax cuts for taxpayers with incomes above $400,000
- Limit the value of itemized deductions for taxpayers with incomes above $400,000
- Increase the estate tax
- Temporarily expand the child tax credit
- Provide a refundable first-time home buyers credit
- Replace deductions (or income exemptions) for retirement contributions with a refundable credit
- Expand and make fully refundable the child and dependent care tax credit
- Increase the corporate income tax rate from 21 to 28 percent
- Increase minimum taxes on foreign-source income of US multinational corporations
- Provide credits for new investments in domestic manufacturing

In the following analysis, we consider all the individual income tax and payroll tax provisions that are modeled on the TPC microsimulation model as well as the corporate income tax rate change. We therefore exclude the proposed changes in the estate tax, the increase in the minimum tax on the foreign-source income of multinationals, and domestic production tax credits, and other corporate income tax provisions as well as proposed modifications to the individual income tax that are not modeled in the TPC microsimulation model: the first time home buyer credit, establishing IRAs and a small-business start-up credit for offering retirement policies, an exemption of forgiven student loans from taxable income, reinstating tax credits for residential energy efficiency, restoring the full electric vehicle tax credit, providing a low income renter's credit, and increasing tax compliance of high income earners. In Section 5 we discuss the implications of not modeling these additional provisions on our results.

2 Interaction Between the TPC Microsimulation Model and OG-USA

We incorporate the TPC microsimulation model into OG-USA in order to capture the effects of the individual income (IIT) and payroll tax provisions.[1] The TPC

[1]Subject to those being modeled in the microsimulation model. See Section 1 for a description of what is and is not captured in this model.

microsimulation model results are incorporated into OG-USA through parametric functions for marginal and effective tax rates that summarize the IIT and payroll tax system.

The TPC microsimulation model used a sample of taxpayers' returns and computes tax liabilities and marginal tax rates for each filer under alternative tax provisions. From these results, we compute effective tax rates (ETR), marginal tax rates on labor income ($MTRx$), and marginal tax rates on capital income ($MTRy$) from both the current law baseline and the Biden tax proposals. The specific reforms modeled in the TPC microsimulation are detailed in Mermin et al. (2020). But we note here that some of the major provisions represent a net reduction in taxes for taxpayers with incomes less than $100,000 and a tax increase for taxpayers with incomes over $400,000, with the largest tax increases levied on incomes over $1 million. Table 1 summarizes the changes in effective tax rates from the TPC microsimulation model between the current law baseline and the Biden proposals by income group.

Table 1: TPC Microsimulation results, average effective tax rate (ETR) levels and changes for different income brackets

Year		$0-$50k	$50k-$100k	$100k-$400k	$400k-$1m	+$1m
2021	pct. pt. dif.	-0.6%	-1.3%	-0.6%	-0.1%	-0.0%
	(reform avg. ETR)	(6.7%)	(15.8%)	(20.1%)	(22.6%)	(28.5%)
2022	pct. pt. dif.	-0.9%	-2.0%	-0.9%	+2.1%	+9.4%
	(reform avg. ETR)	(6.4%)	(15.1%)	(19.8%)	(24.7%)	(38.0%)
2023	pct. pt. dif.	-0.3%	-0.7%	-0.3%	+2.1%	+9.5%
	(reform avg. ETR)	(6.9%)	(16.4%)	(20.6%)	(24.9%)	(38.1%)
2024	pct. pt. dif.	-0.3%	-0.7%	-0.3%	+2.0%	+9.4%
	(reform avg. ETR)	(6.9%)	(16.3%)	(20.6%)	(24,8%)	(38.1%)
2025	pct. pt. dif.	-0.3%	-0.6%	-0.4%	+2.0%	+9.4%
	(reform avg. ETR)	(6.9%)	(16.2%)	(20.7%)	(24.8%)	(38.1%)
2026	pct. pt. dif.	-0.4%	-0.6%	-0.3%	+1.4%	+5.7%
	(reform avg. ETR)	(7.8%)	(17.4%)	(22.1%)	(26.4%)	(35.8%)
2027	pct. pt. dif.	-0.4%	-0.6%	-0.3%	+1.4%	+5.8%
	(reform avg. ETR)	(7.8%)	(17.3%)	(22.1%)	(26.3%)	(35.9%)
2028	pct. pt. dif.	-0.3%	-0.6%	-0.3%	+1.4%	+5.8%
	(reform avg. ETR)	(7.8%)	(17.1%)	(22.0%)	(26.3%)	(35.8%)
2029	pct. pt. dif.	-0.3%	-0.6%	-0.3%	+1.4%	+5.8%
	(reform avg. ETR)	(7.7%)	(16.9%)	(21.9%)	(26.2%)	(35.7%)
2030	pct. pt. dif.	-0.3%	-0.6%	-0.3%	+1.4%	+5.9%
	(reform avg. ETR)	(7.7%)	(16.7%)	(21.7%)	(26.1%)	(35.6%)

* The value in parentheses is the average ETR in the reform.

The approach of the OG-USA macroeconomic model is to fit parametric functional forms to the microsimulation model data. The parametric functional forms provide a parsimonious summary of the effects of the tax system on the incentives to work and save faced by individuals at different levels of income. We find that the functional forms that best capture the increase in tax rates at the high end of the income distribution along with the tax cut at the low end of the income distribution are the Gouveia and Strauss (1994) (GS) functional forms for ETRs and MTRs. Relative to other functional forms, the GS functions give the lowest mean-squared errors when fitting to the simulated data from the current law baseline and proposed policy. The GS functional form for effective tax rates is the following, where the three parameters are ϕ_0, ϕ_1, and ϕ_2, and total income is I.

$$\text{(ETR):}\quad \tau^{etr} \equiv \frac{\phi_0\Big[I - \big(I^{-\phi_1} + \phi_2\big)^{-\frac{1}{\phi_1}}\Big]}{I} \tag{1}$$

The approach used most often when using the Gouveia-Strauss functional form is to derive the marginal tax rates by taking the derivative of the ETR function in equation (1) with respect to the particular type of income. The GS functional form for marginal tax rates is the following.[2]

$$\text{(MTR):}\quad \tau^{mtr} \equiv \phi_0\left[1 - I^{-\phi_1-1}\Big(I^{-\phi_1} + \phi_2\Big)^{\frac{-1-\phi_1}{\phi_1}}\right] \tag{2}$$

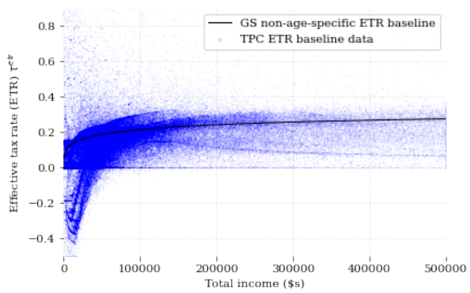
We use Equation 2 as the functional form for marginal tax rates, but estimate the three parameters, ϕ_0, ϕ_1, and ϕ_2, separately for each of three tax functions: the effective tax rate, ETR, the marginal tax rate on labor income, $MTRx$, and the marginal tax rate on capital income, $MTRy$.

The left three panels of Figure 1 show the estimated baseline Gouveia-Strauss ETR, $MTRx$, and $MTRy$ functions (black lines), respectively, and how they fit the TPC microsimulation current law, baseline data (blue dots) in the first year of the budget window, 2021. The left three panels of Figure 1 show the estimated baseline and reform functions (representing the Biden proposals) for the ETR, $MTRx$, and $MTRy$ in 2021. Each GS function is estimated to minimize a weighted nonlinear least squares criterion on the data.

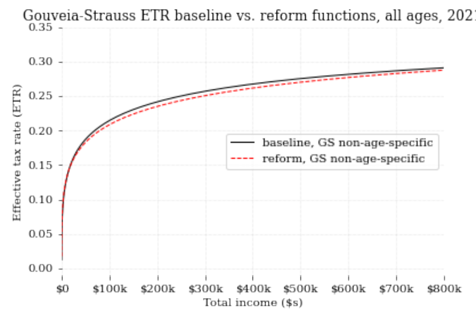
When we simulate the reform in the microsimulation model, the underlying data (blue dots) change. In the case of the Biden reform, taxes decline slightly in 2021 because only the increase child tax credit afters filers' tax liability. Figure 1b shows the two estimated GS ETR functions, and the reform function represents the corresponding small decrease.

Each panel of Figure 2 compares the baseline estimated GS ETR function to its corresponding estimated GS reform function in years 2022 through 2029. Figures 3 and 4 make the same comparisons of the marginal tax rates on labor income ($MTRx$) and the marginal tax rates on capital income ($MTRy$), respectively.

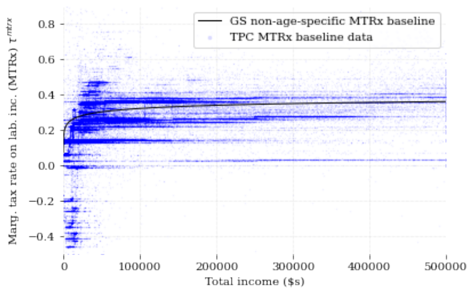
Figure 1: Gouveia-Strauss ETR, MTRx, and MTRy TPC data, baseline and reform estimates, all ages, 2021



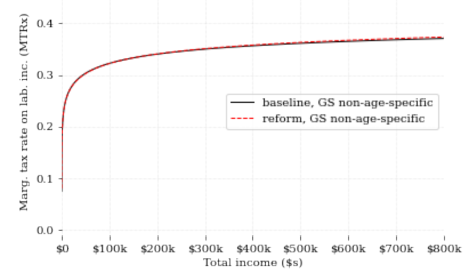
(a) ETR baseline: data vs. GS fit



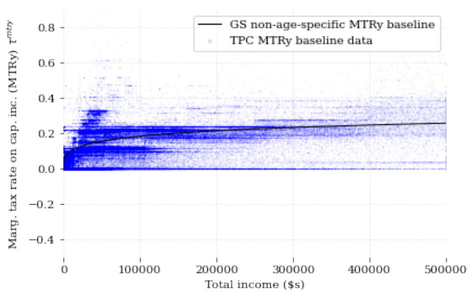
(b) ETR baseline vs. reform



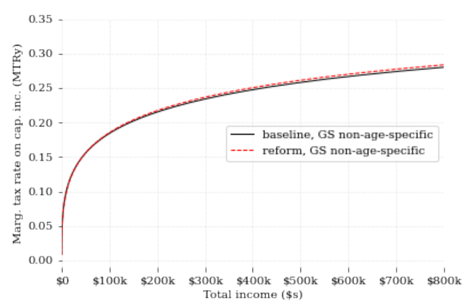
(c) $MTRx$ baseline: data vs. GS fit



(d) $MTRx$ baseline vs. reform

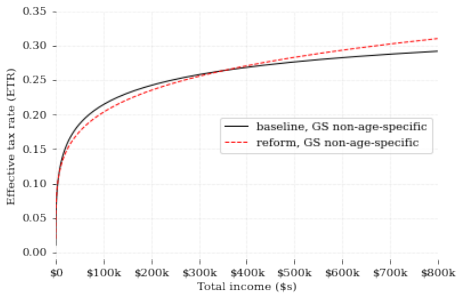


(e) $MTRy$ baseline: data vs. GS fit

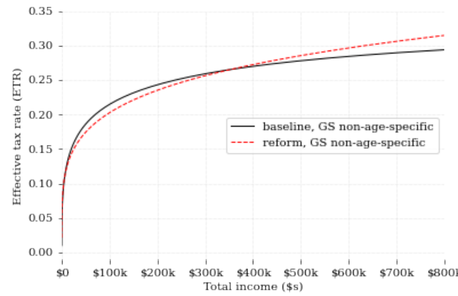


(f) $MTRy$ baseline vs. reform

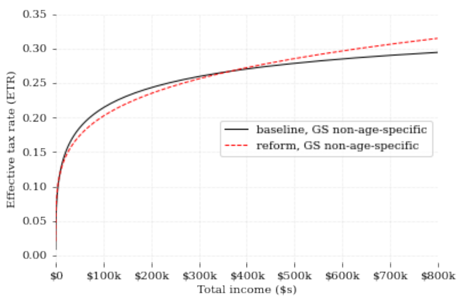
Figure 2: Estimated Effective Tax Rates, Gouveia-Strauss functions, 2022-2029



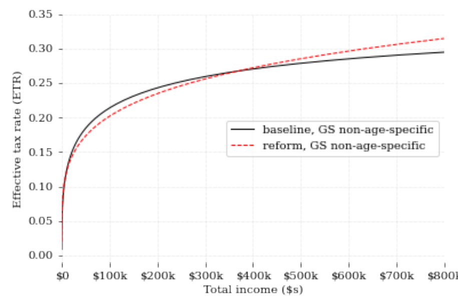
(a) 2022



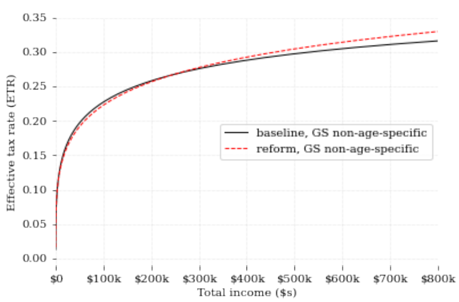
(b) 2023



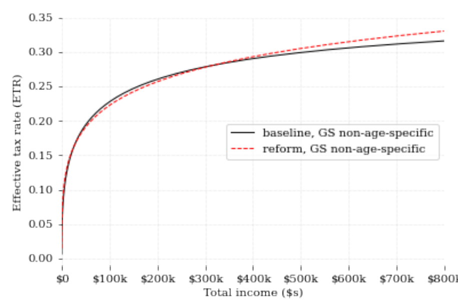
(c) 2024



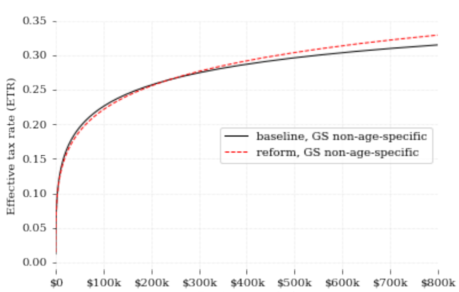
(d) 2025



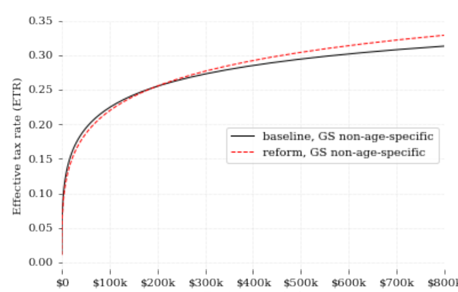
(e) 2026



(f) 2027

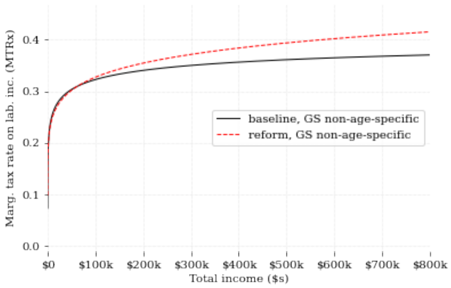


(g) 2028

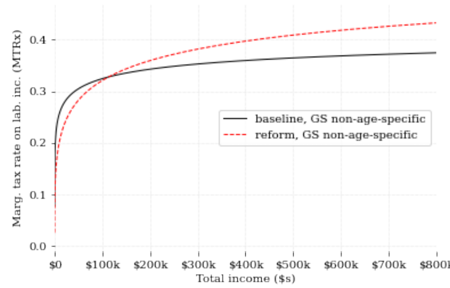


(h) 2029

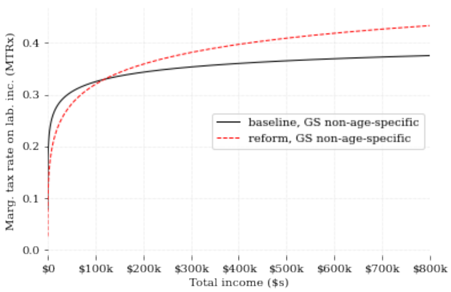
Figure 3: Estimated Marginal Tax Rates on Labor Income, Gouveia-Strauss functions, 2022-2029



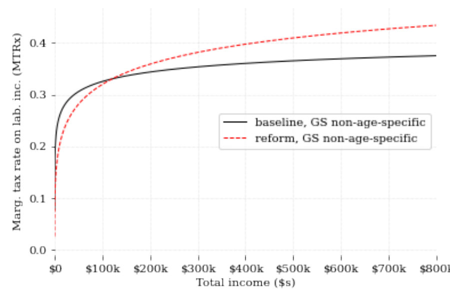
(a) 2022



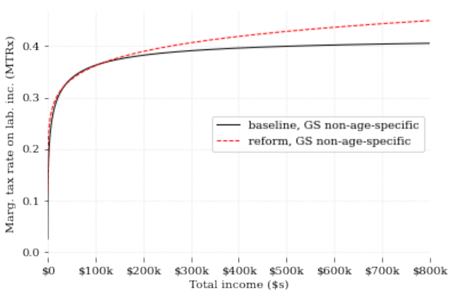
(b) 2023



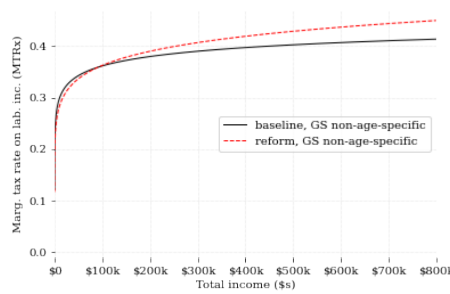
(c) 2024



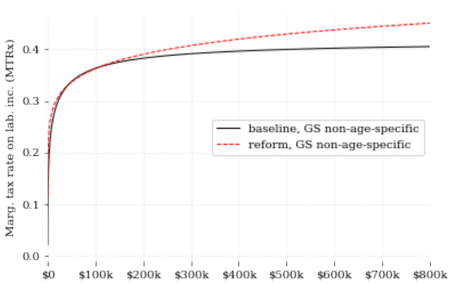
(d) 2025



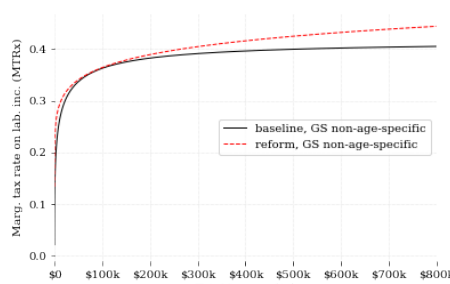
(e) 2026



(f) 2027

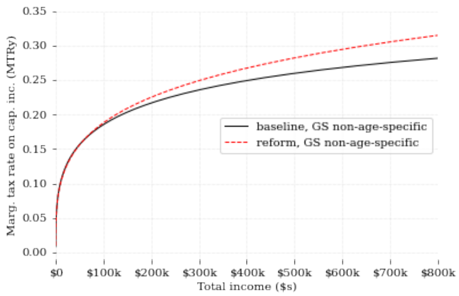


(g) 2028

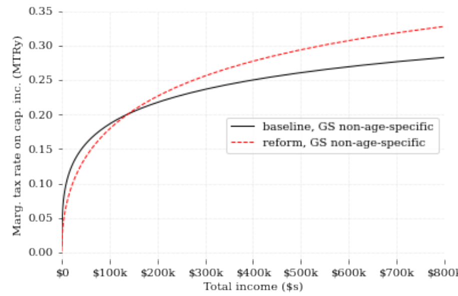


(h) 2029

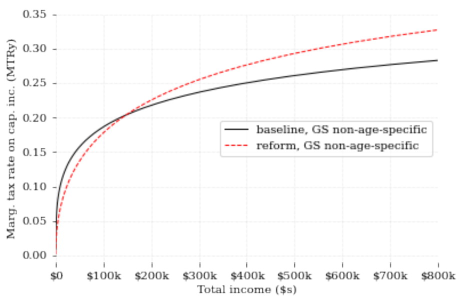
Figure 4: Estimated Marginal Tax Rates on Capital Income, Gouveia-Strauss functions, 2022-2029



(a) 2022



(b) 2023



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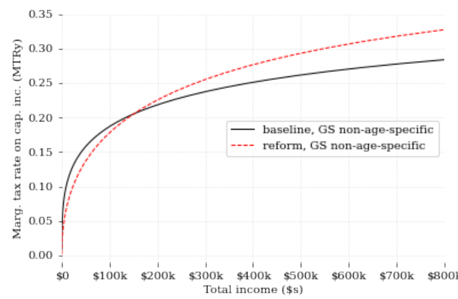
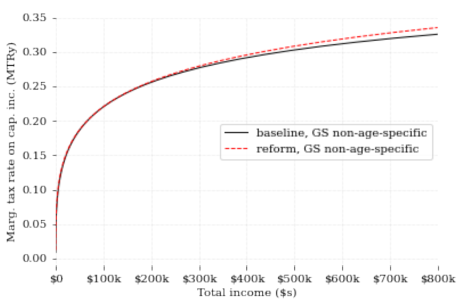
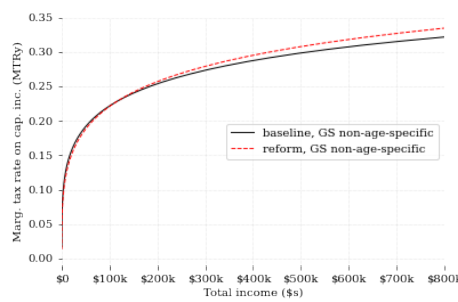


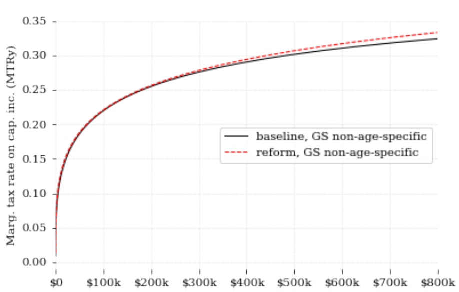
(d) 2025



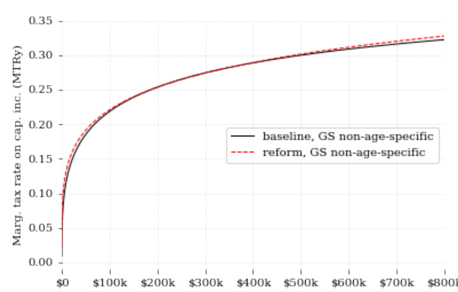
(e) 2026



(f) 2027



(g) 2028



(h) 2029

To summarize the plots above, they capture the differences in the tax system under the Biden campaign proposal. These include a significant increase in taxes on incomes above $400,000 and a tax cut for incomes below $300,000, especially before provisions in the Tax Cuts and Jobs Act (TCJA) expire in 2026 and relatively smaller effects after 2026.

3 Calibration of OG-USA

To effectively model the provisions of the Biden tax proposals, which target tax increases to taxpayers at the very top of the income distribution, the OG-USA model needs to effectively capture the tails of the income and wealth distributions. As can be seen in Figure 2, 3, and 4, the Biden proposals represent a significant tax increase on high incomes and a tax cut on lower incomes. In contrast, policy changes in the TCJA represented broad tax cuts across the entire income distribution. Given that some individuals under the Biden proposals receive a tax cut while others receive a tax increase, the net effect on government revenues depends on how much income is in each group. Therefore, calibrating the OG-USA model to have the correct amount of income among those taxpayers at the top of the income distribution is essential to correctly predict the effect of the policy on government revenue and economic output. However, it is well known that it is difficult to calibrate a heterogeneous agent macroeconomic model with endogenous income to match the highly skewed income and wealth distributions observed in the United States.[3]

We calibrate the parameters of the OG-USA model in two ways to generate realistic distributions of income and wealth. First, we adjust agents' discount factors, following the work of Carroll et al. (2017) on heterogenous discount factors. This helps generate differences in savings between agents that moves the wealth distribution in the model closer to that found in the data. Second, we scale the exogenous lifecycle profiles of earnings to match the distribution of income.

In the OG-USA model, agents preferences are summarized by the following lifetime utility function (3) and period budget constraint (4).

$$U_j \equiv \sum_{s=1}^{S} \beta_j^{s-1} \left[\Pi_{u=E+1}^{E+s}(1-\rho_u)\right] u(c_{j,s,t+s-1}, n_{j,s,t+s-1}, b_{j,s+1,t+s}) \quad \forall j \tag{3}$$

$$\begin{aligned} c_{j,s,t} + b_{j,s+1,t+1} &= (1+r_t)b_{j,s,t} + w_t e_{j,s} n_{j,s,t} + bq_{j,s,t} + tr_{j,s,t} - T_{s,t} \\ &\quad \forall j,t \quad \text{and} \quad s \geq E+1 \quad \text{where} \quad b_{j,E+1,t} = 0 \quad \forall j,t \end{aligned} \tag{4}$$

Equation 3 defines the lifetime utility of a household of type j. The j subscript represents $j \in \{1, 2, ...J\}$ lifetime income group categories. Households' utility is the expected, discounted value of their per period utility $u(c_{j,s,t}, n_{j,s,t}, b_{j,s+1,t+1})$ in each period of life. The flow utility depends on consumption, c, labor supply, n, and

[2]See Nishiyama (2015).

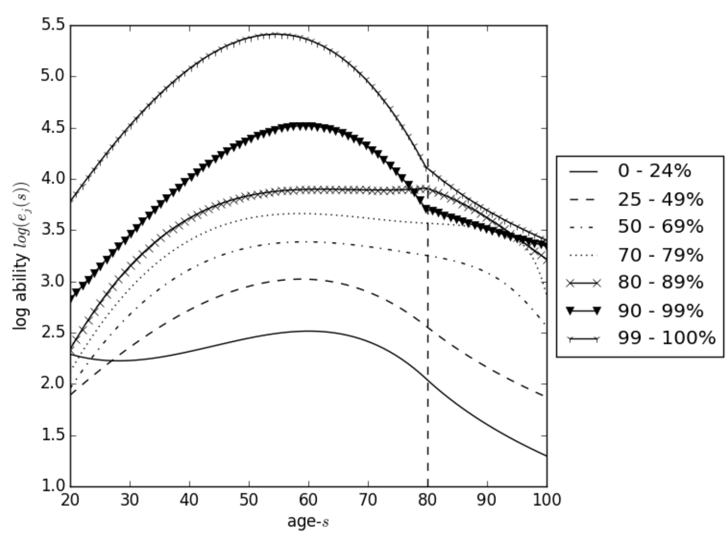
[3]See DeNardi and Fella (2017).

bequests, which are a function of asset holdings, b. Subscript s denotes the households age and t denotes the time period. Households become economically active at age E and live for a maximum of S periods. Households' discount rates are heterogenous across lifetime include groups and are represented by the parameter β_j. Households face mortality risk represented by age-specific mortality rates ρ_s.

The budget constraint, Equation 4, says that spending on consumption, c, and asset purchase, b, must equal the return on assets purchases in the prior period (both principle and interest at rate r) plus labor income (given by the product wage rate per effective hours of labor, w, effective hours of labor per unit of labor supply, e, and the units of labor supplied, n) plus receipts of bequests, bq, plus non-pension government transfers, tr, less net taxes, T.

There are a total of $J = 10$ lifetime income groups and each is characterized by a different calibrated path of earnings ability per unit of labor $e_{j,s}$ that varies deterministically by age s. Previously, the calibration of the OG-USA model from before October 3, 2020 was seven lifetime income groups $J = 7$. The calibrated lifetime earnings ability paths $e_{j,s}$ for each of those seven ability types is represented in Figure 5 and are described in the OG-USA documentation calibration chapter on "Lifetime Earnings Profiles". These original seven lifetime ability groups represent the following seven percentiles λ_j of lifetime earners, from lowest earners to highest:

Figure 5: Exogenous life cycle income ability paths $\log(e_{j,s})$ with $S = 80$ and $J = 7$



$$\lambda_j \in [0.25, 0.25, 0.20, 0.10, 0.10, 0.09, 0.01] \tag{5}$$

So the highest percentile of lifetime earners $\lambda_7 = 0.01$ in this original distribution represented the top 1% of earners.

In a recent addition to OG-USA, the model was modified to allow up to 10 lifetime ability groups, which included the first six groups of the original distribution of λ_j values in (5) and then breaks the top group of 1% into four finer groups $\lambda_j = [0.005, 0.004, 0.0009, 0.0001]$ for $j \in [7, 8, 9, 10]$.[4] Because we did not have panel data sufficient to identify the earnings profiles of these top earners, we use Piketty and Saez (2003) estimates of the ratio mean income in each of these top four percentile groups to the mean income in the top one percent. We then scaled the income profiles for each of these top groups by that ratio.

$$\lambda = [0.25, 0.25, 0.20, 0.10, 0.10, 0.09, 0.005, 0.004, 0.0009, 0.0001] \tag{6}$$

In order calibrate the OG-USA model to match the U.S. wealth and income distributions we manipulate 15 parameters. We follow Carroll et al. (2017) and manipulate the 10 discount factors β_j for $j \in [1, 2, ...10]$ in the lifetime utility function of each agent (3). We also manipulate the five scale factors on the top five lifetime earnings profiles $[scale_6, scale_7, scale_8, scale_9, scale_{10}]$. The second number in the products in the $scale_j$ column of Table 2 represents the income scales from Piketty and Saez (2003). The first number represents an extra scaling in order to match moments.[5]

Our calibrated values for these parameters are shown in Table 2, and the degree to which the endogenous baseline wealth and income model moments match the corresponding data moments is shown in Tables 3 and 4.

Table 2: Calibrated parameter values for β_j and $scale_j$ for matching wealth and income moments

j	Percentile	β_j	$scale_j$
$j = 1$	(0-25%)	0.910	
$j = 2$	(25-50%)	0.910	
$j = 3$	(50-70%)	0.920	
$j = 4$	(70-80%)	0.930	
$j = 5$	(80-90%)	0.950	
$j = 6$	(90-99%)	0.965	2.0
$j = 7$	(99.0-99.5%)	0.970	3.0 * 0.459
$j = 8$	(99.5-99.9%)	0.980	6.0 * 0.847
$j = 9$	(99.90-99.99%)	0.990	8.0 * 2.714
$j = 10$	(99.99-100.00%)	0.995	10.0 * 18.749

It is worth noting that earlier prominent policy experiments with OG-USA worked without careful calibration of the model to the very top of the income wealth and

[4]See OG-USA pull request #655 on October 3, 2020.

[5]This extra scaling in the calibrated values of the $scale_j$ parameters shown in Table 2 are necessary because the moments we are trying to match are endogenous and include behavioral responses.

Table 3: Wealth moments from data and calibrated OG-USA model baseline steady-state

Moment	OG-USA	Data*
Wealth share 0-25%	0.018	-0.004
Wealth share 25-50%	0.055	0.019
Wealth share 50-70%	0.109	0.058
Wealth share 70-80%	0.096	0.059
Wealth share 80-90%	0.152	0.115
Wealth share 90-99%	0.350	0.388
Wealth share 99-100%	0.220	0.365
Wealth Gini coef.	0.692	0.848

* Wealth data moments are calculated from the Survey of Consumer Finances 2019.

Table 4: Income moments from data and calibrated OG-USA model baseline steady-state

Moment	OG-USA	Data*
Income share 0-50%	0.175	0.142
Income share 90-99%	0.283	0.294
Income share 99-100%	0.191	0.184
Income Gini coef.	0.536	0.550

* Income data moments are from Piketty and Saez (2003).

income data moments because policy changes considered in those experiments we not as targeted at the very high income tax payers in the way that the Biden campaign proposals are. Because the Biden reform represents a significant tax increase on the highest earners and a tax cut for the lowest earners, it is important for the model's endogenous income and wealth distributions to match the data in the baseline.

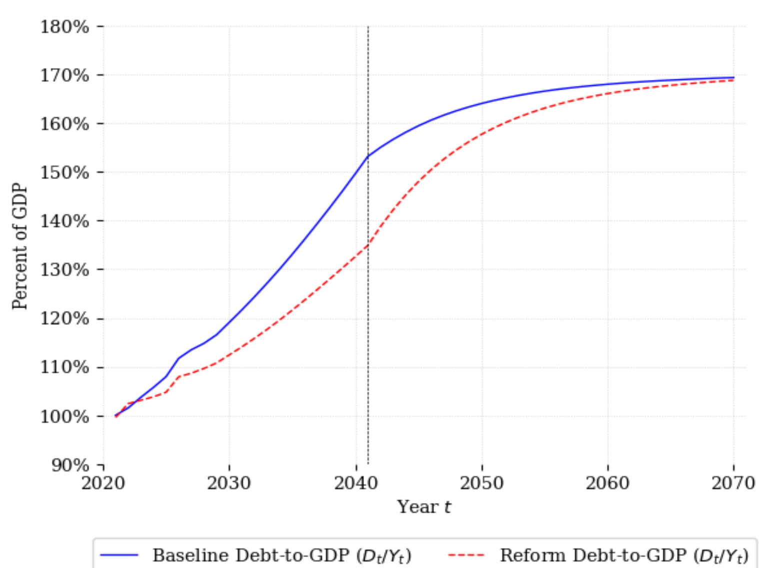
4 Economic and Revenue Impacts

4.1 Macroeconomic Effects

We estimate that the policy changes from the Biden campaign proposals reduce real GDP by about 0.38% per year on average over the first 10 years, as shown in Table 5. It is worth noting that the percent change in GDP is higher under the reform policy after 2038 because the reduced crowding our of private investment.[6]

Due to the increases in tax revenue, the Biden campaign proposals reduce the trajectory of the U.S. debt-to-GDP ratio by about 20 percentage points after 20 years. Figure 6 shows the path of the debt-to-GDP ratio under the baseline and reform scenarios, from 2021-2070. The reduction in government debt allows more private savings to be channeled to private investment, which tends to increase the capital stock and thereby GDP.

Figure 6: Debt-to-GDP Ratio, Current Law Baseline vs. Biden Proposals



[6]The dates for which the percent change in GDP under the reform is higher than the percent change under the baseline are limited to the 2038-to-2043 period because our closure rule of increased government spending is implemented in 2041 (after 20 years) in order to stabilize long-run debt-to-GDP.

Over the near term, the increases in marginal tax rates on high income taxpayers result in a decrease in labor supply and savings. Table 5 summarizes the changes in macroeconomic variables over the 10-year budget window. The tax increases reduce GDP in each year from 2022-2037. Tax reductions for lower income taxpayers in 2021 and the intertemporal substitution of labor by high income taxpayers, boost labor supply and GDP in 2021 anticipating tax increases in 2022 and beyond. As mentioned above, the reduction in economic activity due to high tax rates is overcome after 2037 by the reductions in the crowding out of government debt.

Table 5: Percent Change in Macroeconomic Variables from Biden Proposals

Var.	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2021-2030	Steady state
GDP (Y_t)	0.45	-0.72	-0.20	-0.14	-0.12	-0.74	-0.39	-0.81	-0.75	-0.38	-0.38	-0.99
Consumption (C_t)	-0.20	-0.17	-0.87	-0.66	-0.59	-0.55	-0.63	-0.69	-0.77	-0.83	-0.59	-1.53
Capital Stock (K_t)	0.09	-0.17	-0.28	-0.26	-0.27	-0.41	-0.42	-0.52	-0.58	-0.51	-0.33	-2.61
Labor (L_t)	0.65	-1.02	-0.16	-0.08	-0.04	-0.92	-0.37	-0.96	-0.84	-0.31	-0.40	-0.11
Interest rate (r_t)	0.64	-2.63	-1.53	-1.46	-1.41	-2.26	-1.61	-2.16	-1.96	-1.43	-1.59	1.16
Wage (w_t)	-0.19	0.30	-0.04	-0.06	-0.08	0.18	-0.02	0.15	0.09	-0.07	0.03	-0.88

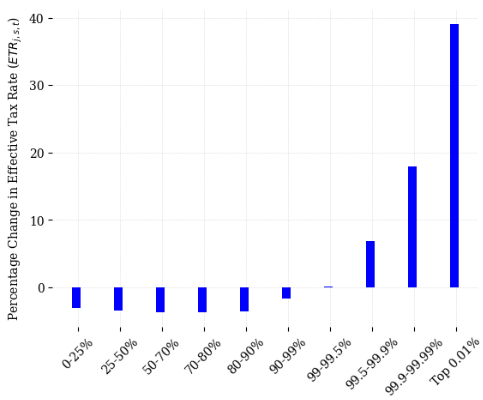
These aggregate effects are largely driven by the behavior of the highest earning taxpayers. As noted above, and as summarized in Figure 7, the Biden proposals represent modest tax decreases on those in the bottom 90% of the income distribution and relatively large increases in tax rates for those at the top of the income distribution.

The declines in aggregate labor supply, savings, and consumption are driven by large decreases among those in the top 1%. Figure 8 shows the percentage changes in consumption, labor supply, savings, and before tax income for agents in each lifetime income group. Effects of the proposals are much larger for those at the very top, especially those in the 0.5%, which corresponds to those who face the largest increase in marginal and effective tax rates. Notice that the effects on labor supply are not monotonic. For those in the top 0.1%, the income and substitution effects offset each other to a greater degree and they do not have the largest decline in labor supply despite seeing the largest increase in marginal tax rates on labor income.

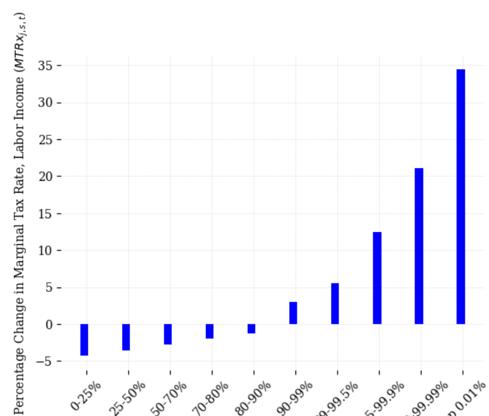
4.2 Tax Revenue

Mermin et al. (2020) present a full accounting of the revenue impacts of the Biden campaign proposals from a static perspective. Here, we analyze the revenue impacts in the context of a model that accounts for the macroeconomic feedback effects of the policies. Table 6 decomposes the total change in tax revenue in the OG-USA model. The first row represents the percentage point change in tax revenue from

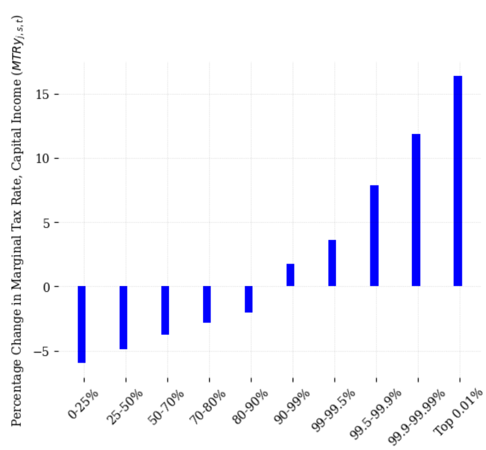
Figure 7: Changes in Tax Rates by Lifetime Income Group, 2021-2031



(a) Effective Tax Rates

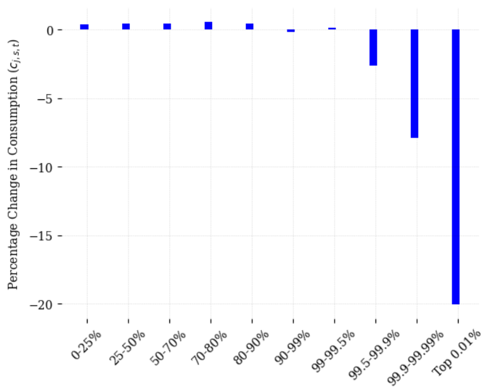


(b) Marginal Tax Rates on Labor Income

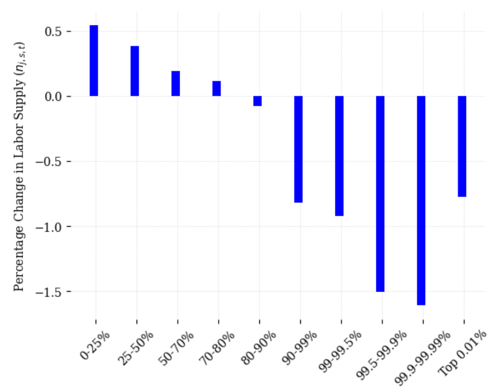


(c) Marginal Tax Rates on Capital Income

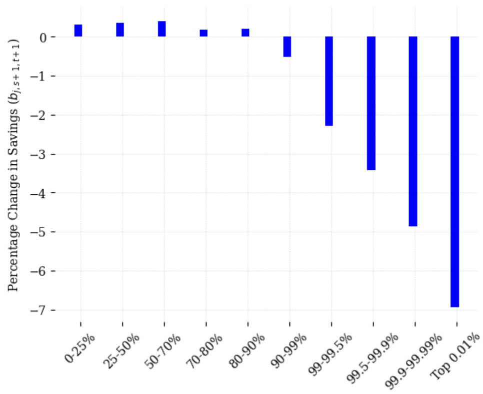
Figure 8: Behavioral Responses by Lifetime Income Group, 2021-2031



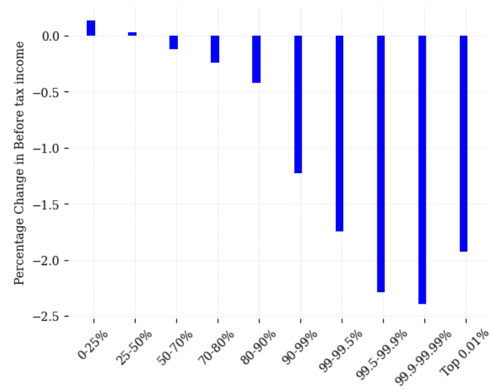
(a) Consumption



(b) Labor Supply



(c) Savings



(d) Before Tax Income

changes in tax rates alone. To compute these, we apply the effective tax rates that result from the Biden proposals on the household and firm decisions made under the current law baseline. This can be thought of as the "truly static estimate" from the macro model.[7] We find that on a static basis, the proposal results in an increase of tax revenue that averages 4.4% in the first 10 years.

Table 6: Decomposition of Revenue Effects from the Biden Proposals

Source	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2021-2030	2031-2040
Tax Rate Changes[a]	-1.05	5.57	6.85	6.82	6.71	3.68	4.85	3.54	2.67	4.88	4.41	4.84
Dynamic Responses[a]	1.00	-1.79	-0.85	-0.92	-1.04	-1.96	-1.35	-2.11	-1.85	-1.48	-1.25	-1.44
Total Effect	-0.07	3.68	5.94	5.84	5.59	1.65	3.13	1.36	0.78	3.34	3.10	3.41

[a] Takes Biden Proposal tax rates and applies them to the baseline behavior and macroeconomic variables.
[b] Percent change of full dynamic response—behavioral responses such as changes in savings and labor supply, and macroeconomic feedbacks effects such as changes in interest rates and wages—from the proposal.

The second row of Table 6 shows the percentage point change, relative to the first row, of including the behavioral and macroeconomic effects of the policy. This represents the dynamic effects on changes in tax revenue. The second row shows that including the behavioral responses of households and firms and the resulting macroeconomic feedback results in a reduction in revenue that averages -1.3% (percentage points) in the first 10 years. This summarizes the total effect of the reductions in labor supply, savings/investment, as well as interest rates and wages, on tax revenue. We arrive at the results in Table 7 by using the percent changes in row 3 of Table 6, adjusting them to fiscal years from calendar years, and applying those changes to the first row of Table 7.[8]

The last row of Table 6 shows the total dynamic estimate of the effect of the Biden proposals on government revenues. We estimate that tax revenues will increase by 3.1% in the first 10 years. This estimate is about 20% lower than would be predicted by a static revenue estimate. This highlights the importance of considering the behavioral responses by high-income households.

[7]The "static estimate" in the macro model takes the estimated parametric effective tax rate functions from the Biden proposal described in Section 3 and apply those to the baseline equilibrium behavior of households. This results in new levels of tax revenue that differ from the baseline but involve no changes in baseline behavior.

[8]The OG-USA estimate of dynamic feedback effects on revenues in Table 7 has been modified for the purposes of combining them with TPCs conventional revenue estimate in order to avoid double counting. The OG-USA estimate of the dynamic effect incorporates the impact on revenues of increased corporate taxes reducing taxable incomes for households (who would receive lower returns from owning shares of businesses as a result of the higher corporate taxes). However, that effect is already included in TPCs conventional estimate of the effect on revenues. Therefore, the OG-USA estimates of the dynamic effect on revenues shown in Table 7 have been adjusted to remove the effect of the change in corporate taxes on taxable household incomes.

Table 7: Decomposition of Revenue Effects in levels from the Biden Proposals (billions of dollars, fiscal years 2021-2040)

Source	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2021-2030	2031-2040
	Fiscal years											
Changes in revenues without macroeconomic feedback[a]	-37	29	150	271	295	267	254	271	288	304	2,092	4,297
Impact of macroeconomic feedback on revenues[b]	36	12	2	-4	-8	-71	-55	-103	-157	-72	-419	-762
Change in revenues with macroeconomic feedback[c]	-2	40	152	267	288	197	199	168	131	233	1,673	3,024

[a] This first row represents the estimated change in government revenue from the TPC static microsimulation model, without incorporating macroeconomic feedback.
[b] Net change in estimated government revenue from static estimate by including the behavioral response of households and firms and the macroeconomic feedback.
[c] This last row is the change in revenues from the macroeconomic model, which incorporates the changes in taxes (row 1) plus the behavioral responses and macroeconomic feedback (row 2).

5 Conclusion

We simulated the effects of President Biden's Tax proposals from 2020 using the OG-USA open source macroeconomic model incorporating tax data from Tax Policy Center's microsimulation model. The proposed policies result in an increase in taxes on the top one percent of earners and a decrease in taxes on the bottom 99 percent of earners as described in Section 2. We find that the proposed tax policies would increase GDP relative to baseline projections by 0.34 percent in fiscal year 2021 but would reduce GDP from 2022 to 2030 an average of -0.45% per year. By 2038 the impact of these tax proposals on GDP become positive due to the reduction in crowding out from reduced government debt. The decrease in output would reduce revenues over the first decade, offsetting about 20% of the net revenue increase projected under the proposals without accounting for macroeconomic feedback effects.

Excluded corporate income tax policies on multinational corporations would result in increased revenue, but also high costs of capital and therefore reduced demand for investment from corporations. This would tend to reduce GDP. The domestic production credit would would tend to increase investment. The estate tax changes would probably decrease savings.

The individual income tax policies not modeled with the TPC microsimulation model would represent relatively small revenue losses on a static basis and would not have significant effects on the macroeconomy if they were able to be captured in OG-USA. Depending on the motivation and distribution of bequests, the proposed estate tax changes may have further dampened savings and investment and thus GDP, but in a way that is not likely to be quantitatively significant.

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