Simulating Effects of the American Rescue Plan Act

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Abstract: *This Quantitative Note describes the new reform file ARPA.json for simulating the American Rescue Plan Act (ARPA) of 2021 using the Tax-Calculator open-source microsimulation model of U.S. personal income taxes and payroll taxes, as well as multiple other open-source policy models in the Policy Simulation Library community.*

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Within days of its passage, an OpenRG modeling team added significant new capabilities for analyzing the major tax provisions of the American Rescue Plan Act of 2021 (ARPA) to the widely used open-source Tax-Calculator microsimulation model of the US federal individual income and payroll tax systems, as well as multiple other open-source policy models in the Policy Simulation Library community. This QN describes the new features of the legislation and offers an overview of the unique and novel analyses available to users of the Policy Simulation Library models, such as the opportunity to analyze the bill, hypothetical alternatives that Congress could have passed, and their effects on the budget, taxpayer behavior, investment incentives.

1. Modeling ARPA

Modeling the ARPA legislation using Tax-Calculator is limited to those parts of ARPA that affect individual income and payroll taxes, as well as closely related provisions such as the direct payments to households. Specifically, the reform file used to model ARPA includes the following provisions:

- Exclusion of unemployment insurance from taxable income
- Expansion of the Child Tax Credit
- Expansions of the Earned Income Tax Credit
- Expansions of the Child and Dependent Care Credit
- Extension of pass-through business loss limitations
- Recovery Rebate Credits

Tax provisions of ARPA that were not modeled include the exclusion of federal student loan debt forgiveness, temporary credits for sick leave and family leave for self-employed filers, business and employer provisions, and changes to health insurance premium credits. Modeling these provisions requires data that the Tax-Calculator developers do not have available and/or are not provisions of the individual income or payroll tax system.

Modeling the included provisions consists of two parts. First, a reform file is created that represents changes in tax law through changes in parameter values and the addition of new parameters. The reform file is available in the PSL Examples repository. This file specifies the changes to previous law made by ARPA. The following code block contains the specification of the `ARPA.json` file.

```
{
"RRC_c": {"2021": 1400,
          "2022": 0},
"RRC_ps": {"2021": [75000, 150000, 75000, 112500,
                    150000],
           "2022": [0, 0, 0, 0, 0]},
"RRC_pe": {"2021": [80000, 160000, 80000, 120000,
                    160000],
           "2022": [0, 0, 0, 0, 0]},
"UI_em": {"2020": 10200,
          "2021": 0},
"UI_thd": {"2020": [150000, 150000, 150000, 150000,
                    150000],
           "2021": [0, 0, 0, 0, 0]},
"CTC_refundable": {"2021": true,
                   "2022": false},
"CTC_include17": {"2021": true,
                  "2022": false},
"CTC_new_c": {"2021": 1000,
              "2022": 0},
"CTC_new_c_under6_bonus": {"2021": 600,
                           "2022": 0},
"CTC_new_for_all": {"2021": true,
                    "2022": false},
"CTC_new_ps": {"2021": [75000, 150000, 75000, 112500,
                        150000],
               "2022": [0, 0, 0, 0, 0]},
"CTC_new_prt": {"2021": 0.05,
                "2022": 0},
"EITC_c": {"2021": [1502.46, 3606.44, 5960.95,
                    6706.58],
           "2022": [546.21, 3640.7, 6017.58,
                    6770.29]},
"EITC_rt": {"2021": [0.153, 0.34, 0.4, 0.45],
            "2022": [0.0765, 0.34, 0.4, 0.45]},
"EITC_ps": {"2021": [11610, 19464.12, 19464.12,
                     19464.12],
            "2022": [8931.38, 19649.03, 19649.03,
                     19649.03]},
"EITC_MinEligAge": {"2021": 19,
                    "2022": 25},
"EITC_MaxEligAge": {"2021": 125,
                    "2022": 64},
"EITC_InvestIncome_c": {"2021": 10000},
"EITC_sep_filers_elig": {"2021": true},
"CDCC_c": {"2021": 8000,
           "2022": 3000},
"CDCC_ps": {"2021": 125000,
            "2022": 15000},
"CDCC_ps2": {"2021": 400000,
             "2022": 9e+99},
"CDCC_crt": {"2021": 50.0,
             "2022": 35.0},
"CDCC_refundable": {"2021": true,
                    "2022": false},
"ALD_BusinessLosses_c": {
   "2026": [283535.22, 567070.42, 283535.22,
            283535.22, 567070.42],
   "2027": [9e+99, 9e+99, 9e+99, 9e+99, 9e+99]}
}
```


Alongside each parameter name are years and values. These denote when a policy parameter changes and to what value it should be set in that year and beyond. Note that only changes from the current law baseline need to be specified. Even without a detailed description of the variables and tax law changes, the JSON snippet remains readable and we can identify the major previsions outlined above.

Second, the Tax-Calculator source code was modified because some of the new provisions do not fit into the existing logic of the tax code. One needs both the reform file specifying the change in policy, together with the newly updated Tax-Calculator model, to simulate ARPA.

When modeling these provisions, we ensure accuracy in the model results by comparing revenue estimates from Tax-Calculator to those provided by the Joint Committee on Taxation (JCT) of the U.S. Congress.[1] The following table summarizes and compares the estimated changes in the revenue between the Tax-Calculator simulation and the JCT estimates.

Some of the differences in these scores can be explained by JCT's use of more recent forecasts of unemployment than what Tax-Calculator uses. These differences primarily affect the provision that excludes unemployment insurance from taxable income and the expansion of the EITC, since EITC claim rates are sensitive to the unemployment rate.

2. Further models and analyses that can be powered by these changes

Tax-Calculator is a powerful tool on its own, capable of producing revenue estimates and distributional analysis. But it is also part of a broader suite of tax policy models cataloged in the Policy Simulation Library.[2] Here we provide some high-level views of how one can use Tax-Calculator and related models to further analyze the ARPA legislation.

2.1 Budgetary analysis

The Tax-Brain model makes it easy to produce traditional revenue estimates of changes in tax law.

2.2 Distributional analysis

With microdata files produced by TaxData or custom datasets provided by users, Tax-Calculator can generate output that allows one to assess the impact of policy on different groups of taxpayers in datasets broadly relevant to the population of interest. Tabulations by income, filing status, number of kids, or other relevant factors can be performed on the detailed output. Features built into Tax-Brain and microdf make this straight-forward for a wide variety of users.

2.3 Behavioral analysis

When producing revenue estimates or conducting distributional analysis, it is often helpful to consider how taxpayers might respond to changes in tax rates. With the Behavioral-Responses package, one can produce revenue estimates or distributional analysis that account for such responses.

[1] See https://www.jct.gov/publications/2021/jcx-14-21/

[2] See the Policy Simulation Library GitHub organization at https://github.com/PSLmodels.

Table 1. Revenue Impacts of ARPA by Provision: Fiscal Years 2021-2030 ($ billions)

	Tax-Calculator Revenue Estimates										2021-
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2030
Extension of noncorporate loss limitation	0.0	0.0	0.0	0.0	0.0	11.4	3.8	0.0	0.0	0.0	15.2
UI exemption	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2
Recovery Rebate Credit	-387.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-387.4
CTC expansion	-25.2	-75.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-100.7
EITC expansion for childless filers	-0.8	-18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-19.3
EITC extended to married separate filers	-0.5	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-1.1
Raise EITC investment income cutoff	-0.4	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-3.0
CDCC expansion	-1.4	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.1
Total	-417.0	-98.0	-0.3	-0.3	-0.3	11.1	3.4	-0.4	-0.4	-0.4	-502.6
	JCT Score										2021-
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2030
Extension of noncorporate loss limitation	0.0	0.0	0.0	0.0	0.0	18.7	12.4	-0.1	0.0	0.0	31.0
UI exemption	-25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-25.0
Recovery Rebate Credit	-393.7	-16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-410.6
CTC expansion	-25.8	-79.2	-0.7	-0.7	-0.7	-0.7	-0.3	-0.3	-0.3	-0.3	-109.2
EITC expansion for childless filers	-0.5	-11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-11.9
EITC extended to married separate filers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2
Raise EITC investment income cutoff	0.0	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-2.1
CDCC expansion	-2.1	-5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-8.0
Total	-447.2	-113.7	-0.9	-0.9	-1.0	17.8	11.9	-0.6	-0.6	-0.6	-536.0

2.4 Example taxpayer analysis

The Tax-Cruncher model allows users to assess how specific taxpayers might be affected depending on their unique characteristics. This is the model to use for questions such as: "What happens to a taxpayer with two children versus one with four children?" or "How do the provisions affect a single filer differently than a joint filer?"

2.5 Dynamic analysis

Using the OG-USA model, one can simulate the broader economic effects of the policy. For example, "What happens to the trajectory of government debt?" "How will GDP or employment respond to the ARPA?"

OG-USA also allows users to change government spending to capture how other, non-tax provisions of the ARPA can affect the budget, interest rates, and other economic outcomes.

2.6 Business investment incentives

The Cost-of-Capital-Calculator model uses the marginal tax rates computed in the Tax-Calculator model, along with changes in business tax provisions, to see how business investment incentives respond. Changes in business loss limitations, as well as expansion of tax credits, affect marginal tax rates on owners' business income and thereby incentives to invest by these businesses.

2.7 Hypothetical reforms

Across all of these models and types of analyses, users can explore a variety of "what ifs". What if Congress had spent more on CTC expansion rather than direct payments to households? What if temporary provisions were made permanent? And so on.

Such analyses can be done by downloading and modifying the ARPA reform JSON file to parameterize these hypotheticals and running that through Tax-Calculator or the related models.

3. Working with OpenRG experts on custom projects

If you are considering a custom project with these models and would like support, please contact the corresponding author listed above. OpenRG experts are committed to supporting journalists and policymakers on a pro bono basis.

Modeling Notes

Links to resources mentioned in this article:

- American Recovery Plan Act of 2021 Reform File:
  - https://github.com/PSLmodels/examples/blob/main/psl_examples/taxcalc/ARPA.json
- Tax-Calculator

  - Documentation: https://taxcalc.pslmodels.org
  - Source Code: https://github.com/PSLmodels/Tax-Calculator
- Tax-Brain
  - Documentation: http://taxbrain.pslmodels.org
  - Source Code: https://github.com/PSLmodels/Tax-Brain
- microdf
  - Documentation: http://pslmodels.github.io/microdf
  - Source Code: https://github.com/PSLmodels/microdf
- Tax-Cruncher
  - Source Code and Examples: https://github.com/PSLmodels/Tax-Cruncher
- Behavioral-Responses
  - Source Code and Documentation: https://github.com/PSLmodels/Behavioral-Responses
- OG-USA
  - Documentation: https://pslmodels.github.io/OG-USA/
  - Source Code: https://github.com/PSLmodels/OG-USA
- Cost-of-Capital-Calculator
  - Documentation: http://ccc.pslmodels.org/
  - Source Code: https://github.com/PSLmodels/Cost-of-Capital-Calculator