

Appendix D

# **The NYCgov Tax Model**

## Appendix D

### The NYCgov Tax Model

Low-income taxpayers, especially those with children, often find that their refundable tax credits are greater than the taxes they owe. As a result, many low-income families have a negative tax rate: They receive more from the income tax system than they pay into it. Tax programs are an increasingly important component of the resources available to families to meet their needs. At the same time, all working families are subject to payroll taxes under the Federal Insurance Contribution Act (FICA). FICA payments offset some of the gains derived from income tax credits. But even with payroll taxes accounted for, the total tax effect on income leads to a reduction in the NYCgov poverty rate.

#### The Tax Model

The American Community Survey (ACS), our primary source of data, does not include information about taxes. NYCgov therefore has created a tax simulation model. The first task in estimating taxes is to create tax filing units within ACS households. The model then applies the tax code to estimate taxes owed and tax credits received by New York City tax filers.

#### Creating Tax Filing Units

ACS households consist of all individuals residing in the same housing unit. Each member of the household is only identified through their relationship to the person answering the ACS questionnaire. This designated reference person is usually, but not always, the primary owner or renter of the housing unit. The household's remaining residents may form a complex network of relationships. Occupants may include a family embodying several generations, and families or individuals not related to the respondent — including roomers and boarders. Because residents are only identified in relation to the reference person, we cannot always determine how they may be related to one another. This presents a challenge in relation to taxes, as we need to

use the information available in the ACS to estimate how many tax returns are filed from each household, and to identify who on each return is the filer (along with their spouse and dependents).

NYCgov addresses this problem by first dividing ACS households into minimal household units (MHUs) that create a richer set of information about how people in a household are related to one another. For example, two boarders who individually report their marital status as “married” will be linked together based upon age and other demographic characteristics. The children of unmarried partners (unless they are coded as children of the respondent) are identified in a similar manner, then each is coded as the child of a specific parent.<sup>1</sup> The tax model next identifies MHU members who are tax filers, along with their spouses and dependents. Additional decisions are made that allocate children and indigent household members as dependents to certain filers. Based on these decisions, each tax filer finally is given the status of Married Filing Joint, Head of Household, Single, or Married Filing Separate.

## The Tax Calculator

A simulated federal, New York State, and New York City tax return is prepared for each tax filing unit based on income and other data provided in the ACS.<sup>2</sup> We then identify adjusted gross income (AGI) for the tax unit, which is the sum of all earned income, interest income, and other income sources. Social Security income is included to the extent it is taxable. Personal exemptions and standard deductions next are subtracted from AGI to determine taxable income. The federal tax liability on that income is calculated, then we go through the steps of a federal 1040 tax return to compute each of the tax credits for eligible filers. An IT-201 New York State tax return, which relies on income and credit calculations from the federal return, is modeled once the 1040 is completed. Computation of the IT-201 generates New York State and New York City tax liabilities and credits. In a final step, FICA, or payroll taxes, are applied to all wage and salary income, and self-employment taxes are deducted from self-employment earnings.

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1 The MHU methodology is derived from Jeffrey Passel's report, “Editing Family Data in Census 2000 Public-Use Microdata Samples: Creating Minimal Household Units (MHUs).” August 23, 2002. The application of Passel's method to the NYCgov model is explained in Vicky Virgin's paper, “Creating the CEO Poverty Unit: An Evaluation Using the CPS ASEC.” June 2011. See: [https://www1.nyc.gov/assets/opportunity/pdf/poverty\\_unit\\_analysis\\_ceo\\_2011.pdf](https://www1.nyc.gov/assets/opportunity/pdf/poverty_unit_analysis_ceo_2011.pdf)

2 Due to a lack of data in the ACS, only a Form 1040 is prepared. We do not estimate itemized deductions, capital gains, and other tax items more common to higher income households. For years prior to 2018, tax estimates for middle to higher income households are less accurate for this reason. In 2018, the Tax Cuts and Jobs Act nearly doubled the standard deduction and minimized some itemized deductions. This resulted in a sharp increase in the number of filers claiming a standard deduction. It also improves our estimates of tax impacts for middle income filers in particular. See: <https://taxfoundation.org/standard-deduction-itemized-deductions-current-law-2019/>

## Tax Policy

The poverty rates reported in this report are affected by changes in the tax code at the federal, state, and city level. The Tax Cuts and Jobs Act (TCJA), whose provisions took effect in tax year 2018, caused different tax outcomes. The TCJA changes specific to our tax model include:

- An increase in the standard deduction and elimination of the personal exemption.
- A doubling of the child tax credit from \$1,000 to \$2,000 per child, and an increase in the maximum income cutoff for eligibility from \$110,000 to \$400,000.
- The refundable part of the child tax credit capped at \$1,400 per child.

The data presented in the next section compare tax liabilities and tax credits from 2014 to 2018. During this time period, other relevant changes in tax policy occurred, including:

- The Affordable Care Act (ACA) Individual Responsibility Mandate went into effect in 2014. The mandate is a tax penalty for failing to acquire minimum essential health care coverage. The ACA includes a tax credit for lower income families who purchase health care coverage. The credit is an integral part of the price structure of public plans available in New York City. We include the credit in the premium costs of medical out-of-pocket expenses (see Appendix H).
- NYC Tax Rates: The tax rate schedule for New York City residents changed for tax year 2017. The number of tax brackets was reduced from five to four, with a top marginal tax rate of 3.876 percent extended to taxable incomes of over \$90,000 for married couples filing a joint return, and taxable incomes of over \$60,000 and \$50,000 for heads of households and single filers, respectively. Marginal tax rates also increased – by 0.171 percentage points for the lowest bracket and 0.228 percentage points for the three highest brackets.
- New York State Family Tax Relief Credit: Tax year 2017 marked the end of the refundable credit of \$350 for taxpayers with one or more dependents under 17 years of age and an adjusted gross income between \$40,000 and \$300,000.
- New York City School Tax Credit (STAR): Beginning in 2016, the school tax relief credit for New York City taxpayers was converted from a personal city income tax credit to a personal state income tax credit. Tax filers with federal adjusted gross incomes of over \$250,000 are ineligible for the credit (an amount equal to \$125 for married couples filing jointly and \$62.50 for single filers). Certain taxpayers also can claim the credit through a reduced tax rate. This report's analysis assumes that as city residents, taxpayers receive the flat credit.

## Taxes in Detail

This section compares tax liabilities and tax credits from 2014 to 2018. Table D.1 and Table D.2 each divide tax filers into two groups: Panel A consists of filers in poverty while Panel B consists of filers in near poverty, with NYCgov incomes from 100 to 150 percent of the NYCgov poverty threshold. The division illustrates the impact of tax programs as income rises.

## Major Tax Components

Table D.1 shows the major components of the tax model. Taxable Income is AGI after standard deductions and exemptions. Pre-Credit Liability is the total federal, state, and city income taxes due on taxable income before any credits are applied. Federal, state, and city credits are the sum of tax credits received from each level of government. The Net Income Tax Effect is the total effect of the income tax system on resources. A positive value for Net Income Tax Effect indicates that tax credit refunds are greater than taxes owed. In other words, the tax system generates a net gain to the taxpayer. A negative number indicates a net loss to the taxpayer, since taxes paid are greater than taxes refunded. The final row of each panel combines the Net Income Tax Effect with payroll taxes for the Net Income Tax + Net FICA Effect on income.

Panel A of Table D.1 shows that filers in poverty have a positive Net Income Tax Effect value for each year shown, representing a net gain to the NYCgov measure of family income after taxes. Even with payroll taxes taken into consideration, taxes remain a net gain for households in poverty. But as income rose, the net effect of taxes declined beginning in 2016. Panel B shows an annual net loss to household resources each year for filers in near poverty, due to the combined effect of income and payroll taxes.

In addition to income taxes, FICA (payroll taxes for Social Security and Medicare) is another piece of the total tax picture. FICA rises with earnings, and the total FICA tax rate for individuals is 7.65 percent of wages. The final row in each panel, Net Income Tax + Net FICA Effect, shows the combined effect of income and payroll taxes, including tax credits. Here, too, a positive number represents a net gain and a negative number a net loss to taxpayers.

Table D.2 details individual tax credits from 2014 to 2018. Total Tax Relief is the sum of all credits. We include as a negative tax credit in this table the Affordable Care Act's Individual Responsibility Mandate, effectively a tax penalty (beginning in 2014). Although ACA penalties have increased by law each year since, the total estimated amount of penalties assessed and paid has decreased since its peak in 2016 (total NYC amount not shown). The Earned Income Tax Credit (EITC) is the largest tax credit available to the working poor, but the total amount of EITC claimed by the population in poverty and near poverty continues to decrease, as shown in Panels A and B of Table D.2. We explore the source of this decline in the section below.

## The EITC and Rising AGI

The EITC is the largest of the refundable tax credits provided at the federal, state, and city level. Close to 660,000 filers received a total of \$2.2 billion in EITC credits in 2018 (not shown). However, for the population in poverty (Table D.2, Panel A), as incomes at the lower end of the distribution increased, the total amount of EITC claimed decreased over the five-year period 2014 to 2018. The table's Panel B shows that for filers in near poverty, the total amount of EITC claimed decreased by 21.6 percent over that same time period.

The EITC is designed to increase as earned income grows. Yet Figure D.1 illustrates how growth in earned income leaves some working families less eligible for earned income credits. At a certain income level (and depending on marital status and number of children in a family), the value of the credit plateaus at its maximum then slowly phases out as income grows beyond the range of the plateau.

In Figure D.1 we plot earned income density for two family types: Panel A shows married joint filers, with two children, eligible for the EITC. Panel B shows single heads of households, with one child, eligible for the EITC. Points A and B in each panel mark the income range where the EITC plateaus at its maximum value (“max-credit range”). As the credit begins to taper off, its phase-out range falls beyond Point B. Point C marks the income level where credit eligibility ends. For both family types, the density clearly shifted to the right between 2014 and 2018. This shift is indicative of an increase in income among a majority of tax filers in both groups. However, some differences in income distributions for these family types do exist.

In 2014, the earned income of a majority of married tax filers with two children fell within the phase-out range. Subsequent increases in earned income pushed a large portion of married couple families beyond eligibility. By 2018, the majority of EITC recipients in this group continued to cluster around incomes that corresponded to the middle of the phase-out range.

In 2014, single head of household filers with one child were concentrated in the “max credit” range. As their income grew, by 2018 they shifted into the phase-out range. A majority of these filers still were clustered around the maximum credit and the beginning of the phase-out range. But they experienced less phase-out in credit value than married couple filers.

Combined outcomes for both groups of filers explains the declining effect of the tax relief seen earlier in Table D.1. In Chapter 2 of this report, Table 2.7 shows how income growth replaces the loss of EITC dollars as the minimum wage rises.

**Taxes and the Poverty Rate**

The poverty rate would be higher in the absence of net taxation. For low-income New Yorkers, payroll and income taxes are offset by tax credits large enough to create an addition to their total resources. Table D.3 illustrates the impact of taxation on the poverty rate. The table compares poverty rates calculated net of the tax effect against poverty rates calculated with total NYCgov income, including a tax effect. Some of the income tax benefit is offset by mandatory payroll taxes. The marginal effect of FICA increases the poverty rate by an average of 2.3 percentage points from 2014 to 2018, yet taxes still have an overall positive effect on household resources. Measuring the combined effect of payroll and income taxes, we find a 1.2 percentage point decline in the NYCgov poverty rate in 2018. In the absence of payroll and income taxes, the NYCgov poverty rate of 19.1 percent in 2018 would have been 20.2 percent.

Table D.1  
**Components of Net Income Tax Effect, 2014–2018**

Total Dollar Value (\$1,000s)

	2014	2015	2016	2017	2018	2017–2018	2014–2018
<b>Panel A. In Poverty</b>						<b>Percent Change</b>	
Adjusted Gross Income	6,009,291	5,626,180	5,798,751	6,534,982	6,103,239	-6.6%	1.6%
Taxable Income	1,661,846	1,323,465	1,482,704	1,848,712	1,798,849	-2.7%	8.2%
Pre-Credit Liability	404,061	316,161	352,255	449,454	416,669	-7.3%	3.1%
Federal Credits*	745,500	786,497	746,518	757,367	791,534	4.5%	6.2%
State Credits	237,126	249,607	237,191	249,922	253,679	1.5%	7.0%
City Credits	80,554	81,092	79,746	83,262	79,106	-5.0%	-1.8%
Net Income Tax Effect**	653,988	788,214	688,542	621,556	687,795	10.7%	5.2%
Payroll Tax (FICA)	539,767	510,464	520,262	579,571	562,257	-3.0%	4.2%
<b>Net Income Tax + Net FICA Effect</b>	<b>114,221</b>	<b>277,750</b>	<b>168,280</b>	<b>41,985</b>	<b>125,538</b>	<b>199.0%</b>	<b>9.9%</b>
<b>Panel B. In Near Poverty (100–150% of Poverty Threshold)</b>						<b>Percent Change</b>	
Adjusted Gross Income	20,967,039	21,401,524	21,675,553	22,493,791	20,241,042	-10.0%	-3.5%
Taxable Income	8,675,067	8,873,458	9,250,570	9,790,422	9,497,108	-3.0%	9.5%
Pre-Credit Liability	1,992,203	2,033,069	2,120,143	2,288,102	2,048,105	-10.5%	2.8%
Federal Credits*	1,561,830	1,586,757	1,489,303	1,508,793	1,571,803	4.2%	0.6%
State Credits	461,290	468,979	440,271	421,968	421,261	-0.2%	-8.7%
City Credits	142,860	146,761	142,281	144,284	127,557	-11.6%	-10.7%
Net Income Tax Effect**	162,566	141,093	-91,029	-255,441	33,832	-113.2%	-79.2%
Payroll Tax (FICA)	1,646,803	1,683,719	1,705,488	1,767,924	1,583,977	-10.4%	-3.8%
<b>Net Income Tax + Net FICA Effect</b>	<b>-1,484,236</b>	<b>-1,542,627</b>	<b>-1,796,517</b>	<b>-2,023,364</b>	<b>-1,550,146</b>	<b>-23.4%</b>	<b>4.4%</b>

Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.

\*Federal credits are net of Affordable Care Act Shared Responsibility Payments, where applicable.

\*\*Net Income Tax differs from pre-credit liability, net of credits, due to rounding and limits on some nonrefundable credits by tax liability.

The sign of net income tax effect indicates the effect of taxes on household income. A positive net income tax effect indicates a net positive impact on households, and a negative net income tax effect indicates a net negative value of taxes on households.



## Appendix D

Table D.2

### Selected Tax Credits, 2014–2018

Total Dollar Value (\$1,000s)

#### Panel A. In Poverty

	2014	2015	2016	2017	2018	Percent Change	
						2017–2018	2014–2018
Federal							
Child and Dependent Care Credit	13,170	7,985	10,763	11,792	10,047	-14.8%	-23.7%
Child Tax Credit (+ACTC)*	156,531	155,620	159,596	161,270	214,530	33.0%	37.1%
Elderly and Dependent Credit	273	184	249	214	151	-29.2%	-44.5%
Education Credit**	51,539	50,760	50,425	54,122	56,506	4.4%	9.6%
Earned Income Credit, Federal	523,988	571,948	525,485	529,968	510,299	-3.7%	-2.6%
Affordable Care Act Penalty	-5,131	-12,822	-22,658	-19,541	-19,855	1.6%	286.9%
New York State							
Household Credit	9,136	8,983	8,788	9,661	8,672	-10.2%	-5.1%
Child and Dependent Care Credit	8,937	6,251	8,660	9,498	8,121	-14.5%	-9.1%
Child Tax Credit	14,466	11,559	12,597	15,106	26,807	77.5%	85.3%
Tuition Credit	47,557	52,954	49,873	60,785	60,700	-0.1%	27.6%
Real Property Tax Credit	1,202	1,131	1,346	1,243	941	-24.3%	-21.8%
Earned Income Credit, NY State	152,266	166,382	152,888	153,628	148,438	-3.4%	-2.5%
Family Credit	3,561	2,347	3,039	N.A.	N.A.	N.A.	N.A.
New York City							
Household Credit	2,290	2,209	1,939	2,265	1,781	-21.4%	-22.2%
School Tax Credit (STAR)	39,054	38,152	36,704	38,413	35,568	-7.4%	-8.9%
Expanded Real Property Tax Credit	12,459	11,658	14,040	15,581	15,226	-2.3%	22.2%
Child and Dependent Care Credit	552	476	788	501	1,010	101.5%	83.2%
Earned Income Credit, NYC	26,199	28,597	26,274	26,501	25,520	-3.7%	-2.6%
Total Tax Relief	1,058,049	1,104,375	1,040,797	1,071,009	1,104,464	3.1%	4.4%

Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.

\*Includes refundable additional child tax credit.

\*\*Combines American Opportunity Credit and Lifetime Learning Credit.

Notes: N.A. Not applicable in that tax year.

The sum of nonrefundable credits may be limited by total tax liability at the level of individual filers.

*continued on the following page*

## Appendix D

Table D.2 (continued)

### Selected Tax Credits, 2014–2018

Total Dollar Value (\$1,000s)

#### Panel B. In Near Poverty (100–150% of Poverty Line)

	2014	2015	2016	2017	2018	Percent Change	
						2017–2018	2014–2018
Federal							
Child and Dependent Care Credit	22,008	26,122	22,329	23,388	19,787	-15.4%	-10.1%
Child Tax Credit (+ACTC)*	464,051	474,521	450,989	493,627	671,275	36.0%	44.7%
Elderly and Dependent Credit	400	679	189	226	101	-55.3%	-74.7%
Education Credit**	157,286	146,306	146,654	144,116	160,941	11.7%	2.3%
Earned Income Credit, Federal	918,084	939,129	869,142	847,436	719,698	-15.1%	-21.6%
Affordable Care Act Penalty	-11,211	-28,335	-42,743	-42,384	-38,684	-8.7%	245.1%
New York State							
Household Credit	19,019	18,714	17,911	17,449	13,341	-23.5%	-29.9%
Child and Dependent Care Credit	15,353	19,450	14,638	15,390	15,737	2.3%	2.5%
Child Tax Credit	70,212	72,554	67,057	80,059	110,816	38.4%	57.8%
Tuition Credit	68,787	62,838	64,229	62,787	71,745	14.3%	4.3%
Real Property Tax Credit	1,163	1,066	812	843	432	-48.7%	-62.8%
Earned Income Credit, NY State	265,397	272,293	252,159	245,439	209,189	-14.8%	-21.2%
Family Credit	21,360	22,064	23,465	N.A.	N.A.	N.A.	N.A.
New York City							
Household Credit	3,969	3,343	3,046	3,401	2,245	-34.0%	-43.4%
School Tax Credit (STAR)	71,569	71,718	71,118	70,572	61,455	-12.9%	-14.1%
Expanded Real Property Tax Credit	21,011	23,513	23,719	27,460	25,216	-8.2%	20.0%
Child and Dependent Care Credit	407	1,230	942	458	2,650	478.6%	551.4%
Earned Income Credit, NYC	45,904	46,956	43,457	42,394	35,990	-15.1%	-21.6%
Total Tax Relief	2,154,769	2,174,161	2,029,113	2,032,661	2,081,936	2.4%	-3.4%

Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.

\*Includes refundable additional child tax credit.

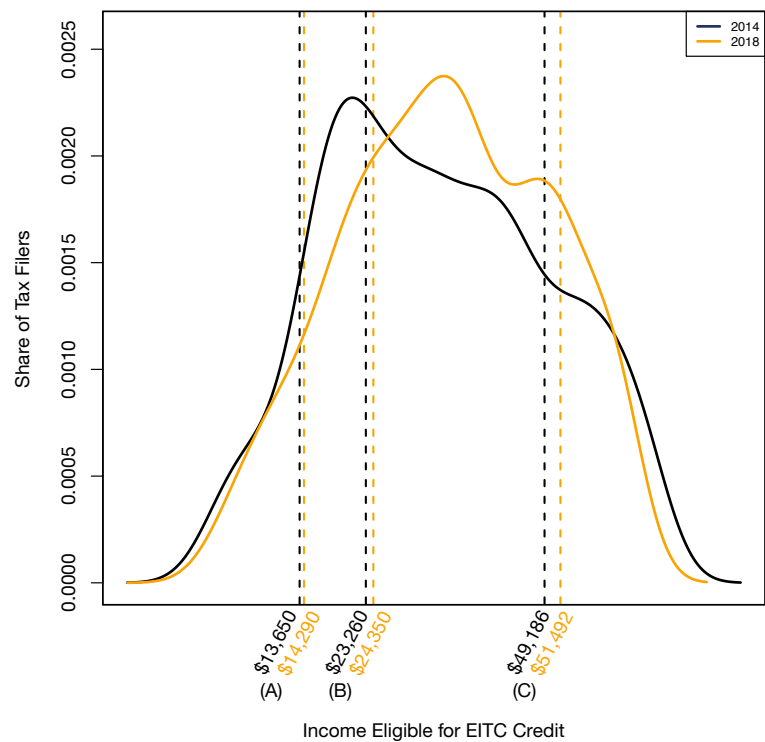
\*\*Combines American Opportunity Credit and Lifetime Learning Credit.

Notes: N.A. Not applicable in that tax year.

The sum of nonrefundable credits may be limited by total tax liability at the level of individual filers.

Figure D.1

Panel A: Distribution of Earned Income for Married Joint Filers with Two Children



Panel B: Distribution of Earned Income for Head of Household Filers with One Child

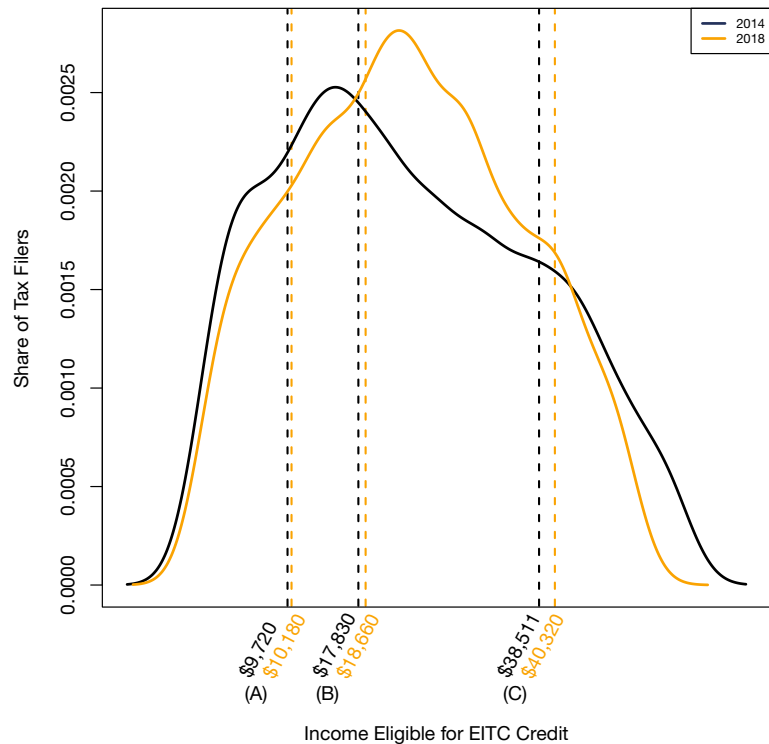


Table D.3

**Impact of Net Taxes on Poverty Rates, 2014–2018**

(Numbers are Percent of the Population)

<b>Panel A. Poverty Rates</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Total NYCgov Income	20.2	19.6	19.0	19.3	19.1
Net of:					
Income Taxes	24.5	24.0	23.0	22.7	22.3
FICA (Payroll Taxes)	17.9	17.4	16.8	16.9	16.6
Income Taxes and FICA	22.2	21.4	20.7	20.5	20.2
<b>Panel B. Marginal Effects</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Income Taxes	-4.3	-4.4	-3.9	-3.4	-3.2
FICA (Payroll Taxes)	2.3	2.2	2.2	2.3	2.4
Income Taxes and FICA	-2.0	-1.8	-1.7	-1.2	-1.2

Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.