Difference-in-differences Model

Our analytic approach adopts a generalized difference-in-differences analysis with multiple treatment units, including two-way fixed effects for each individual and year. We estimate the effect of the state-level EITC policy on an outcome of interest Y_{ist} for individual i living in state *s* in year *t*. Let $D_{st} = StateEITC_s \times Post_t$ represent exposure to the state-level EITC policy after implementation of the policy, equal to zero during the pre-policy period in states that eventually pass EITC policies and for all non-EITC states. Our main estimating equation is:

$$Y_{ist} = \beta_0 + \beta_1 D_{st} + \beta_2 IndividualCov_{ist} + \beta_3 StateCov_{st} + \alpha_i + \theta_t + \varepsilon_{ist}$$

where *IndividualCov* and *StateCov* represent the individual-level and state-level covariates described in the manuscript. α_i represents indicator variables for each individual (i.e., individual fixed effects), implying that the effect is estimated from within-person variation in exposure to different state EITC benefit levels, which overcomes confounding due to unobserved time-invariant individual characteristics. Similarly, θ_t represents indicator variables for years (i.e., year fixed effects), which accounts for all (observed and unobserved) period-specific changes that affect all states, such as changes in national taxation levels or federal welfare policies. Finally, ε_{ist} represents robust standard error clustered at the state level, to account for correlated observations in each state. The coefficient of interest $\beta_1$represents the effect of state-level EITC policies on the outcome of interest among EITC-eligible individuals. Alternate model specifications include an indicator for each state (i.e., state fixed effects).

Supplemental Table 1. State EITC Programs

State	Percent of Federal Credit	Refundable	First Tax Year Implemented	Included in Study
California	85	Yes	2015	Yes
Colorado[a]	10	Yes	1999, 2015	No
Connecticut	30	Yes	2011	Yes
Delaware	20	No	2006	Yes
Hawaii	20	No	2017	Yes
Illinois	10	Yes	2000	Yes
Indiana	9	Yes	1999	Yes
Iowa	15	Yes	1990	Yes
Kansas	17	Yes	1998	Yes
Louisiana	3.5	Yes	2008	Yes
Maine	5	Yes	2000	Yes
Maryland[b]	26	Yes	1987	No
	50	No		
Massachusetts	23	Yes	1997	Yes
Michigan	6	Yes	2008	Yes
Minnesota	34 (avg.)	Yes	1994	Yes
Montana	3	Yes	2019	Yes
Nebraska	10	Yes	2006	Yes
New Jersey	35	Yes	2000	Yes
New Mexico	10	Yes	2007	Yes
New York	30	Yes	1991	Yes
North Carolina[c]	5	Yes	2008-2013	No
Ohio	10	No	2013	Yes
Oklahoma	5	No	2002	Yes
Oregon	8	Yes	1997	Yes
Rhode Island	15	Yes	2001	Yes
South Carolina	20.83	No	2018	Yes
Vermont	32	Yes	1988	Yes
Virginia	20	No	2006	Yes
Washington[d]	10	Yes	Not currently implemented	Yes
Wisconsin	4 (one child) 11 (two children) 34 (three children)	Yes	1984	Yes
District of Columbia	40	Yes	2000	Yes

Note: These data were drawn from Markowitz et al., 2017, and updated with the most recent years of state EITC data. EITC: earned income tax credit.

[a] Colorado's original state EITC program was contingent on state surplus revenue and was therefore not available in 2002-2014; the program became permanently available in 2015.

[b] Maryland offers a 25.5 percent refundable or a 50 percent non-refundable EITC; taxpayers can choose to claim either, but not both.

[c] North Carolina eliminated its EITC program starting in 2014 tax year.

[d] Washington enacted a refundable credit in tax year 2009; due to the budget shortfall, policymakers have not financed the credit.

Supplemental Table 2. Outcomes available by survey year, Panel Study of Income Dynamics, 1995-2015

Outcomes	Survey Years Available
General health	1995-1997 (annual), 1999-2015 (biennial)
Psychological distress	2001, 2003, 2007-2015 (biennial)
Currently drinks alcohol	1999-2015 (biennial)
Drinks per day	1999-2015 (biennial)
Currently smokes	1999-2015 (biennial)
Number of cigarettes per day	1999-2015 (biennial)

Supplemental Table 3. Effect of state-level EITC programs on mental health and health behaviors, sensitivity analyses, Panel Study of Income Dynamics, 1995-2015

	Effect of State EITC Program β (95% CI)	
Outcome	Model 1: EITC Eligible in Pre-Period	Model 2: State EITC Refund
General health excellent/very good/good	0.047 (-0.048, 0.14)	0.0056 (-0.050, 0.061)
Psychological distress	1.59 (-0.075, 3.26)	-0.35 (-0.98, 0.29)
Currently drinks alcohol	0.084 (-0.0057, 0.17)	0.0065 (-0.041, 0.054)
3+ alcoholic drinks per day	0.030 (-0.059, 0.12)	0.030 (-0.013, 0.073)
Currently smokes	0.018 (-0.061, 0.096)	-0.013 (-0.051, 0.025)
Number of cigarettes per day	0.089 (-1.08, 1.26)	-0.23 (-1.12, 0.66)

Study sample was drawn from the Panel Study of Income Dynamics for survey years 1995-2015. Coefficients represent the effect of living in a state after implementation of state-level EITC All models adjusted for age, age-squared, head of household marital status, number of children, inflation-adjusted household pre-tax income, and income-squared, state gross domestic product per capita, state unemployment rate, state percent of population with a high school degree or less, and fixed effects for individual and year. Model 1 includes individuals eligible for federal EITC in all years before state EITC policy. Model 2 includes the full study sample and sets state EITC refund amount (inflation-adjusted, rescaled to $1,000 US dollars) as the primary exposure. Robust standard errors were clustered at the state level. EITC: earned income tax credit.

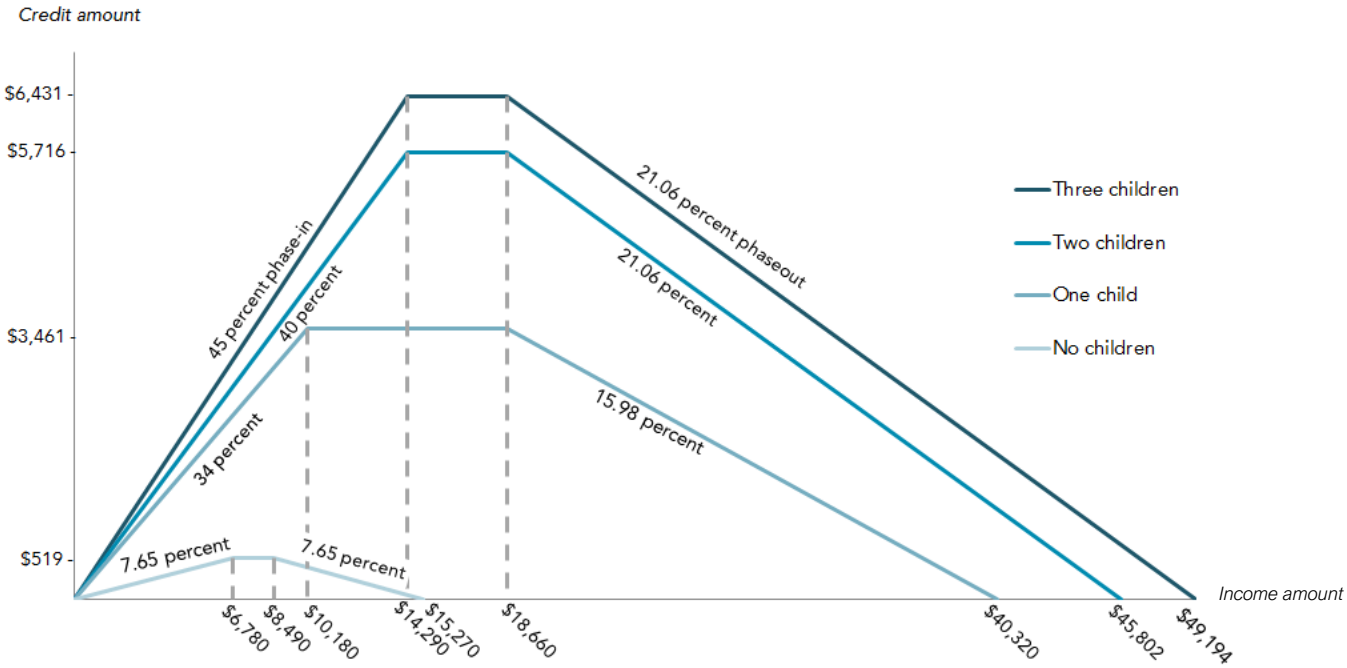
Supplemental Table 4. Effects of state-level EITC programs on mental health and health behaviors, using State-level Fixed Effects in the Panel Study of Income Dynamics, 1995-2015

	Effect of State EITC Program β (95% CI)							
	Full Sample	Marital Status		Gender		Race		
Outcome	Model 1	Model 2: Single	Model 3: Married	Model 4 Male	Model 5 Female	Model 6 White	Model 7 Black	Model 8 Hispanic/Other
Excellent/very good/good health	0.0024	0.0088	-0.0015	0.033*	-0.016	0.016	-0.022	0.016
	(-0.019, 0.024)	(-0.026, 0.044)	(-0.033, 0.030)	(0.0050, 0.061)	(-0.044, 0.012)	(-0.018, 0.050)	(-0.052, 0.0084)	(-0.14, 0.17)
Psychological distress	0.077	0.030	0.24	0.015	0.15	-0.027	0.14	-0.18
	(-0.15, 0.31)	(-0.26, 0.32)	(-0.25, 0.72)	(-0.64, 0.67)	(-0.33, 0.63)	(-0.42, 0.37)	(-0.25, 0.53)	(-2.74, 2.39)
Currently drink alcohol	-0.0016	-0.039	0.041	0.014	-0.0071	0.036	-0.029	-0.016
	(-0.043, 0.040)	(-0.098, 0.019)	(-0.028, 0.11)	(-0.030, 0.057)	(-0.058, 0.044)	(-0.023, 0.095)	(-0.078, 0.020)	(-0.14, 0.10)
3+ alcoholic drinks per day	0.0079	0.0055	0.015	-0.023	0.028*	0.033	0.0047	-0.092*
	(-0.020, 0.036)	(-0.039, 0.050)	(-0.033, 0.062)	(-0.069, 0.023)	(0.0030, 0.052)	(-0.019, 0.086)	(-0.029, 0.039)	(-0.18, -0.0070)
Currently smoke	-0.0059	-0.0069	0.0014	0.0072	-0.014	0.022	-0.020	0.13*
	(-0.046, 0.034)	(-0.071, 0.057)	(-0.031, 0.034)	(-0.031, 0.046)	(-0.074, 0.046)	(-0.030, 0.074)	(-0.076, 0.036)	(0.0072, 0.26)
Number of cigarettes per day	-0.58	-0.27	-0.75	-0.40	-0.74	-0.13	-0.74	1.22
	(-1.31, 0.14)	(-1.15, 0.60)	(-1.83, 0.33)	(-1.66, 0.86)	(-1.58, 0.10)	(-1.13, 0.87)	(-1.58, 0.094)	(-0.54, 2.99)

* $p < 0.05$

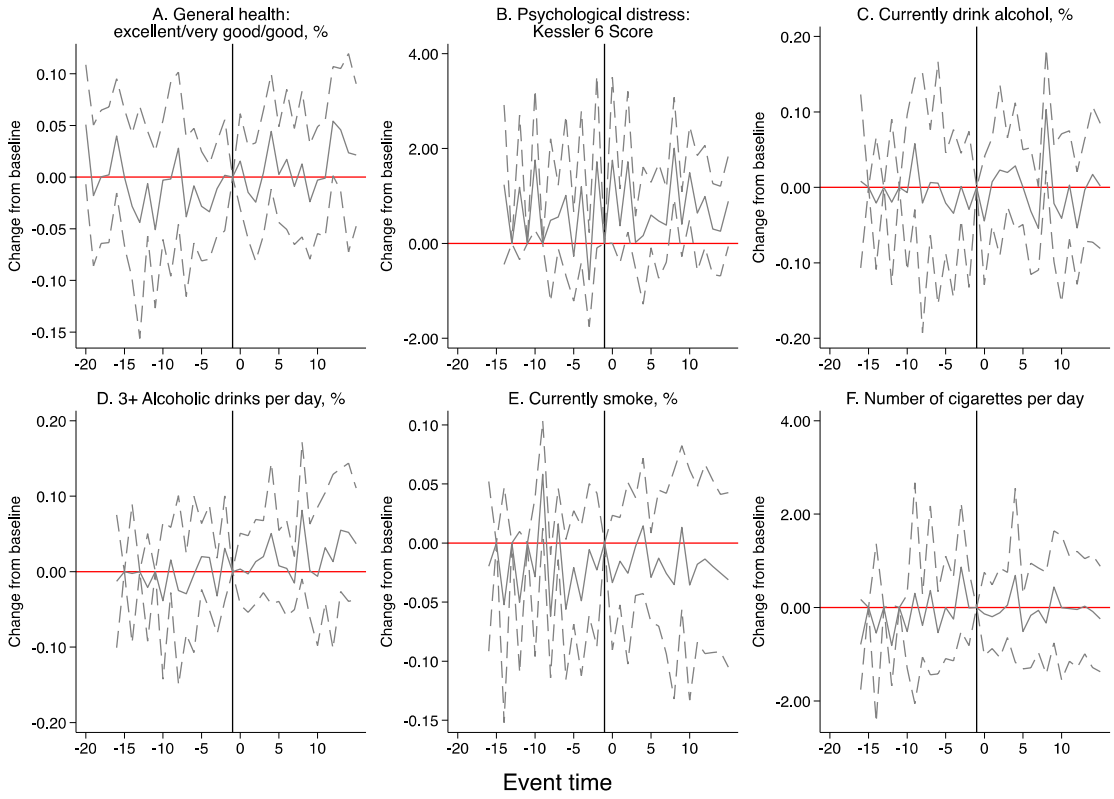
Study sample was drawn from the Panel Study of Income Dynamics for survey years 1995-2015. Coefficients represent the effect of living in a state after implementation of state-level EITC. All models adjusted for gender, age, age-squared, education, head of household race and marital status, number of children, pre-tax inflation-adjusted household earned income, income-squared, state gross domestic product per capita, state unemployment rate, state percent of population with a high school degree or less, and fixed effects for state and year. Robust standard errors were clustered at the state level. EITC: earned income tax credit.

Supplemental Figure 1. Earned Income Tax Credit, 2018



Note: Assumes all income comes from earnings. Amounts are for taxpayers filing a single or head-of-household tax-return. For married couples filing a joint tax return, the credit begins to phase out at income $5,690 higher than shown.
Source: Urban-Brookings Tax Policy Center (2018).

Supplemental Figure 2. Event study estimates relative to state EITC implementation, by outcome



Note: Point estimates (solid lines) are displayed along with their 95% confidence intervals (dashed lines). The baseline (omitted) period is 1 year prior to state EITC implementation. Point estimates represent the difference between EITC and non-EITC states, compared to the prevailing difference, anchored at zero, in the omitted baseline period.