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Income assistance programs and population health – The dual impact of minimum wages and the earned income tax credit

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ABSTRACT

In this study, we provide new evidence on the interaction of state-level minimum wages and Earned Income Tax Credit (EITC) laws on several measures of population health. Using data from the National Vital Statistics Reports between 1999 and 2018, we estimate difference-in-differences models to evaluate the dual impact of minimum wages and the EITC on various causes of mortality, such as suicides, motor accidents and assaults. While several researchers have examined the health effects of both these policies separately, few studies have examined the potential interaction effects of these policies. Specifically, while previous work has provided evidence that both minimum wages and the EITC can reduce suicide rates, our study contributes to the literature by showing that the policies have a positive dual impact on population health. We find that a $1 increase in minimum wages reduces death rates due to suicides and assaults by 3.8 percent and 15.2 percent in states with EITC laws, respectively. In contrast, we show that minimum wages do not impact these outcomes in states without state-level EITC laws.

1. Introduction

The existence of a significant positive association between income and health, also known as the income gradient in health, has been well documented (e.g. Case et al., 2002; Deaton, 2002). Nonetheless, it is not entirely clear whether this association is the result of a causal relationship. There are good reasons to believe that a causal link between income and health exists. Higher income families may have better access to care as well as more opportunities to purchase care, whereas people with lower income may be confronted with more stressful situations, which are detrimental to health. Prior studies have examined policy changes to the Earned Income Tax Credit (EITC) and minimum wages as exogenous income variations on health outcomes. For example, studies have shown that expanding the EITC can improve the health of children (Baughman and Duchovny, 2016; Averett and Wang, 2016), infants (Hoynes et al., 2015), mothers (Evans and Garthwaite, 2014), and low-income adults (Larrimore, 2011; Lenhart, 2018). Evidence for minimum wages is more mixed - while some studies show that higher minimum wage can lead to significant improvements in health outcomes among low-wage workers (e.g., Averett et al., 2017; Lenhart, 2017; Wehby et al., 2019; Hafner and Lochner, 2022), others find no effects (Horn et al., 2017; Kronenberg et al., 2017, Maxwell et al., 2022).

Despite much work having looked at the effects of both programs, not much is yet known about the dual impact of these policies on health outcomes. In this paper, we explore this dual effect by examining a period of 20 years that includes several state-level policy changes to both minimum wages and the EITC. We examine whether generous laws for both programs lead to improvements in population health. In particular, we examine the effects on death rates due to suicides, motor accidents and assaults. To our knowledge, this is the first study that examines the dual impact of minimum wages and EITC laws on a range of population health outcomes.

Between 1996 and 2019 the annual number of suicides in the United States increased from 30,903 to 47,511. A report by The Commonwealth Fund (2020) shows that, among wealthy countries, the U.S. has the highest suicide rates, which is almost twice as high as in the United Kingdom. A small number of previous studies have examined the role minimum wages and EITC laws on suicides. Gertner et al. (2019) finds that increases in minimum wages reduce suicide rates, while Lenhart (2019) finds that state EITC laws are associated with reductions in suicide rates. Similarly, Dow et al. (2020) provide evidence that increases in both policies reduce non-drug related suicides among low-educated adults. With respect to potential effects on crime-related outcomes, two papers have previously shown that minimum wages and state EITC

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laws are associated with reductions in crime (Agan and Makowsky, 2023; Lenhart, 2021). The effects of these programs on death rates due to motor accidents might be different than for suicides and assaults, especially if increases in the two income assistance policies positively affect employment and thus work-related travel.

The federal EITC, introduced in 1975, is one of the largest and most effective anti-poverty programs in the U.S. that provides a refundable credit to low-income households based on their income and family status. In 2022, 28 states and Washington. D.C. offer state-level EITC benefits in addition to the federal benefit. In 2023, 30 states have a minimum wage above the federal minimum wage, which has remained at $7.25 since 2009. There is a significant variation in state minimum wage rates, with Washington having the highest rate of $17. Previous work has shown that there are several pathways through which higher minimum wages can impact physical health outcomes, such as health insurance coverage, health care access and health care utilization (Lenhart, 2020), reduced smoking (Wehby et al., 2019), reduced binge drinking (Horn et al., 2017), or improved mental well-being (Reeves et al., 2017).

2. Data

The main objective of this study is to measure the dual impact of state-level EITC rates and minimum wages on mortality rates due to suicide, motor accidents, and assaults. We use state-level data on annual death rates per 100,000 population, which is provided by the National Vital Statistics System. Information on state EITC laws is obtained from annual reports by the Internal Revenue Service (IRS).[1] Our analysis uses two measures to capture the generosity of minimum wages – real minimum wages and the Kaitz index, which shows the ratio of the effective minimum wage to median annual wages.[2] During the period of our study, there were 295 state-level changes to effective minimum wages and 79 increases to state EITC rates. Our analysis also uses information on time-varying state-level characteristics, including unemployment rates, poverty rates, real GDP, and uninsurance rates.[3]

Fig. 1 shows changes in death rates from all three mortality causes used in our analysis between 1999 and 2018, separately for states with and without state EITC laws. While only providing descriptive evidence, the figure shows that death rates were lower in states that offer state-level EITC benefits throughout the sample period. Similarly, Fig. 2 illustrates that suicide rates are lower in states that provide state-level EITC payments in addition to federal EITC benefits.

3. Methodology

Our analysis estimates difference-in-difference models (DID) where states with minimum wages higher than the federal rate serve as the treatment group and those with the federal minimum wage form the control group. Using OLS models, we estimate the following specification:

$$Y_{st} = \beta_0 + \beta_1 \, \text{MinWage}_{st} + \beta_2 \, \text{EITC}_{st} + \beta_3 \, X_{st} + \lambda_1 \, \text{Year}_t + \lambda_2 \, \text{State}_s + \varepsilon_{st} \quad (1)$$

where y_{st} denotes our health outcomes of interest outcome of interest (such as age-adjusted suicide rates in state 's' and time 't', motor accidents, and assaults). MinWage_{st} measures real minimum wages, while EITC_{st} controls for the state-level EITC benefits. X_{st} represents a set of controls accounting for potential state-level confounding factors.[4] Finally, both year and state fixed effects are included in the analysis. We estimate Eq. (1) for all states as well as separately for states with and without state EITC benefits to examine whether the two programs have a dual impact on population health.[5]

4. Results

Table 1 presents our main estimates for the effects of minimum wages on death rates. Panel A estimates Eq. (1) using all states. We find that a $1 increase in the effective state-level minimum wage is associated with a reduction in death due to all three causes combined by 6.94 ($p<0.10$) per population of 100,000, which corresponds to a reduction of 0.88 percent. When examining effects on each of the three causes of mortality separately, we show that increases in minimum wage significantly reduce death rates due to both suicides and assaults, while not having an impact on motor accident deaths.

Next, we investigate the dual impact of minimum wages and state EITC laws (Panels B and C). Our results show that the inverse relationship between minimum wages and deaths from suicides and assaults is entirely driven by states with EITC laws. In these states, a $1 increase in the effective real minimum wages is associated with a reduction in suicides by 0.45 ($p<0.01$) and a reduction in assault deaths by 0.88 ($p<0.01$) per 100,000, which corresponds to changes of 3.8 and 15.2 percent, respectively. In contrast, we find that higher minimum wages have no impact on suicide and assault rates in states without state-level EITC laws.

When re-estimating our main specifications using state-level data Kaitz index as an alternative measure for minimum wages, we again find that more generous minimum wage laws are associated with a statistically significant reduction in suicide rates that is largest in EITC states (Table 2). An increase in the state Kaitz index by 0.1 is associated with a reduction in suicide rates by 0.72 ($p<0.01$) per 100,000 for all states, which corresponds to a reduction of 6.01 percent. Finally, we also estimate the effects on suicide rates separately by gender and race. We find that the effects of minimum wages and state EITC are larger for men and Whites (Appendix Table A2).[6]

5. Conclusion

The results of this study add to previous work on health-related effects of EITC and minimum wage policies. We provide evidence that there is a dual effect of the programs that can enhance positive impacts on mental health, measured by reductions in suicides in states with higher minimum wages and state EITC laws. This finding is in line with the previous evidence in the literature showing an inverse relationship between suicides and minimum wages (Gertner et al., 2019, Dow, 2020) and the EITC separately (Dow, 2020; Lenhart, 2019). Our study also provides evidence for a dual impact of minimum wages and state EITC laws on crime, measured by death rates due to assaults. This finding is consistent with previous evidence showing that state EITC benefits are

[1] Appendix Table A1 provides average annual minimum wages and states EITC rates for the period of our study.

[2] Data on minimum wages is collected from the Bureau of Labor Statistics (BLS), while annual data on the state-level Kaitz index is obtained from the Washington Center for Equitable Growth (Zipperer et al., 2019).

[3] Information on unemployment rates is collected from the BLS, real GDP data is obtained from the Bureau of Economic Analysis, uninsurance data comes from the Current Population Survey, while information on poverty rates is collected from the U.S. Census Bureau.

[4] The state-level controls include state unemployment rates, state level real GDP, the share of state population below the age of 65 without any insurance coverage and state poverty rates.

[5] While we have information whether the state EITC benefits are refundable or non-refundable, we decided to group all states with any EITC law together due to the small sample size of states offering non-refundable credits. In additional specifications, we use the annual state Kaitz index as the indicator for minimum wages (MinWage_{st}) instead of real minimum wages, which provides evidence whether the findings are robust to alternative measures of minimum wage generosity.

[6] It should be noted that, while not precisely estimated, the estimate for states with EITC laws (Panel B) is actually slightly larger for Blacks than for Whites.

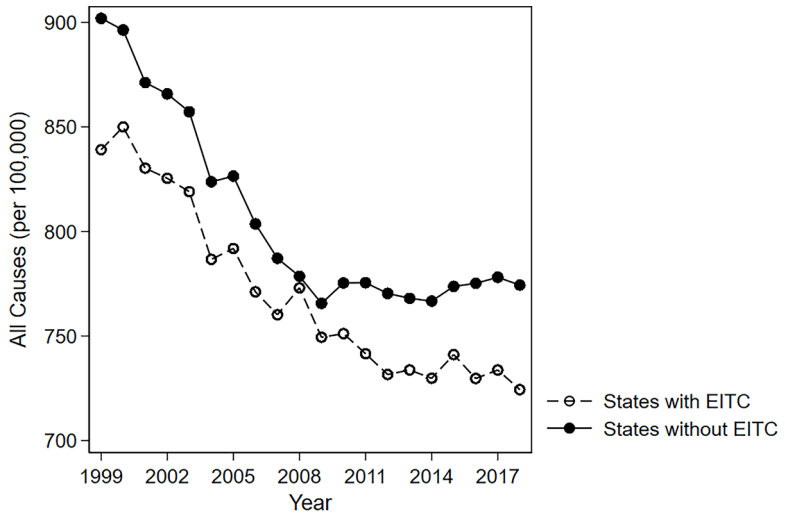

Fig. 1. Deaths from all suicides, motor accidents and assaults (per 100,000), states with and without EITC.

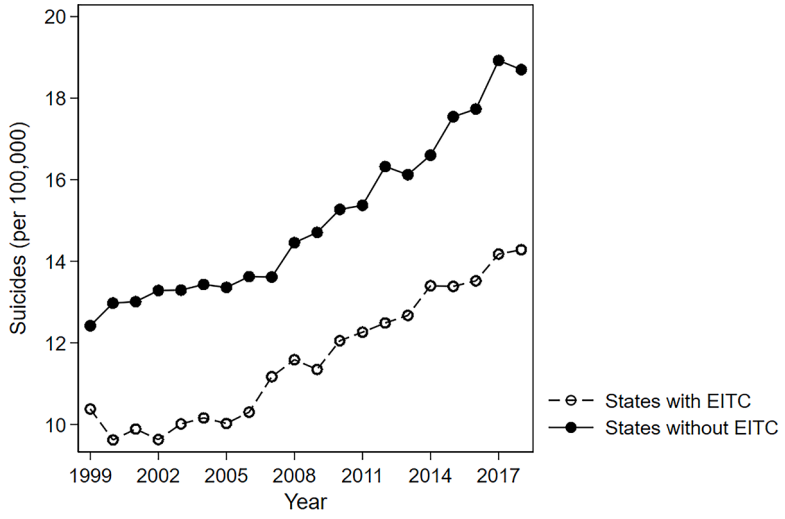

Fig. 2. Suicides (per 100,000), states with and without EITC.

Table 1
The Effects of Minimum Wages on Death Rates, per 100,000 (1999–2018).

	All Causes	Suicides	Motor Accidents	Assaults	N
Panel A: All States					
Treatment Effect	−6.94*	−0.37**	−0.14	−0.68***	1020
	(4.10)	(0.16)	(0.11)	(0.25)	
Sample Mean	792.33	13.60	14.60	5.92	
Panel B: States with EITC					
Treatment Effect	−11.55**	−0.45***	−0.21	−0.88***	418
	(4.95)	(0.14)	(0.14)	(0.23)	
Sample Mean	761.27	11.98	11.54	5.80	
Panel C: States w/o EITC					
Treatment Effect	−1.71	−0.16	0.04	−0.15	602
	(3.61)	(0.33)	(0.21)	(0.25)	
Sample Mean	813.89	14.74	16.73	6.00	

Robust standard errors, clustered by state, are shown in parentheses. All specifications control for state poverty rates, state unemployment rates, state real GDP, state uninsurance rates, state-level EITC rates and state and year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 2
The Effects of the Kaitz Index on Death Rates, per 100,000 (1999–2018).

	All Causes	Suicides	Motor Accidents	Assaults	N
Panel A: All States					
Treatment Effect	1.24	−0.51**	−0.46**	−0.08	1020
	(4.60)	(0.26)	(0.21)	(0.60)	
Sample Mean	792.33	13.60	14.60	5.92	
Panel B: States with EITC					
Treatment Effect	−0.58	−0.72***	−0.36	−0.19	418
	(3.58)	(0.21)	(0.32)	(0.55)	
Sample Mean	761.27	11.98	11.54	5.80	
Panel C: States w/o EITC					
Treatment Effect	−4.00	−0.42	−0.17	0.31	602
	(4.77)	(0.46)	(0.34)	(0.32)	
Sample Mean	813.89	14.74	16.73	6.00	

Robust standard errors, clustered by state, are shown in parentheses. All specifications control for state poverty rates, state unemployment rates, state real GDP, state uninsurance rates, state-level EITC rates and state and year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

negatively associated with recidivism (Agan and Makowsky, 2023) and violent crime (Lenhart, 2021).

Our results suggest that more states should consider implementing state-level EITC benefits, while the federal minimum wages should also be increased after remaining unchanged since 2009. In addition to providing improvements in earning inequality and reducing poverty, increases in the generosity of both programs can positively impact society through unintended benefits on mental health and crime.

Declaration of Competing Interests

None.

Data availability

Data will be made available on request.

Appendix

Table A1, Table A2

Table A1
Minimum wages and state EITC rates over time.

Year	Minimum Wage (nominal)	State EITC (% of federal rate)	
		All States	*States with EITC*
1999	5.26 (0.27)	0.02 (0.05)	0.11 (0.07)
2000	5.32 (0.37)	0.04 (0.08)	0.14 (0.10)
2001	5.38 (0.48)	0.05 (0.09)	0.15 (0.10)
2002	5.42 (0.53)	0.05 (0.09)	0.17 (0.11)
2003	5.48 (0.63)	0.05 (0.09)	0.15 (0.11)
2004	5.52 (0.68)	0.05 (0.09)	0.15 (0.11)
2005	5.61 (0.73)	0.05 (0.10)	0.16 (0.11)
2006	5.75 (0.83)	0.06 (0.10)	0.16 (0.11)
2007	6.33 (0.79)	0.06 (0.10)	0.16 (0.11)
2008	6.77 (0.59)	0.07 (0.11)	0.15 (0.11)
2009	7.23 (0.43)	0.07 (0.11)	0.16 (0.11)
2010	7.43 (0.36)	0.07 (0.11)	0.16 (0.11)
2011	7.46 (0.39)	0.07 (0.11)	0.16 (0.11)
2012	7.51 (0.45)	0.08 (0.11)	0.16 (0.11)
2013	7.54 (0.48)	0.08 (0.11)	0.16 (0.11)
2014	7.66 (0.56)	0.08 (0.11)	0.16 (0.10)
2015	7.95 (0.79)	0.08 (0.11)	0.16 (0.11)
2016	8.15 (1.05)	0.10 (0.15)	0.19 (0.17)
2017	8.35 (1.23)	0.10 (0.16)	0.19 (0.17)
2018	8.59 (1.53)	0.11 (0.16)	0.20 (0.16)
All Years	6.74 (1.35)	0.07 (0.11)	0.16 (0.12)

Standard deviations are shown in parentheses. Data for minimum wages is collected from the Bureau of Labor Statistics (BLS), whereas information on state EITC laws is obtained from annual reports by the Internal. Revenue Service (IRS).

Table A2
The Effects of Minimum Wages on Suicides, by Gender and Race (1999–2018).

	Gender		Race		N
	Male	*Female*	*White*	*Black*	
Panel A: All States					
Treatment Effect	−0.63***	−0.03	−0.52***	−0.21	1020
	(0.22)	(0.10)	(0.11)	(0.17)	
Sample Mean	22.14	5.71	15.61	6.36	
Panel B: States with EITC					
Treatment Effect	−0.71***	−0.13	−0.38***	−0.42	418
	(0.21)	(0.09)	(0.13)	(0.28)	
Sample Mean	19.53	5.13	13.95	6.20	
Panel C: States w/o EITC					
States without EITC	−0.47	0.15	−0.53**	0.13	602
	(0.48)	(0.19)	(0.21)	(0.16)	
Sample Mean	23.96	6.10	16.73	6.47	

The estimates show the effects in response to an increase in the effective state minimum wage by $1. Robust standard errors, clustered by state, are shown in parentheses. All specifications control for state poverty rates, state unemployment rates, state real GDP, state uninsurance rates, state-level EITC rates as well as both state and year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

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