NBER WORKING PAPER SERIES

THE EFFECT OF SAFETY NET GENEROSITY ON MATERNAL MENTAL HEALTH AND RISKY HEALTH BEHAVIORS

Lucie Schmidt
Lara Shore-Sheppard
Tara Watson

Working Paper 29258
http://www.nber.org/papers/w29258

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2021

This project was supported with a grant from the University of Kentucky Center for Poverty Research through funding by the U.S. Department of Agriculture, Economic Research Service and the Food and Nutrition Service, Agreement Number 58-5000-3-0066. The opinions and conclusions expressed herein are solely those of the authors and should not be considered as representing the opinions or policies of the sponsoring agencies. We are thankful to Melanie Guldi, Craig Gundersen, Jim Ziliak, and conference participants at the Association for Public Policy and Management Annual Conference, Southern Economic Association Annual Conference, and the USDA/UKCPR grant reporting conference for helpful comments and suggestions, and to Pat Barnes and Dave Schneider for their help with the restricted NHIS data. Louisa Abel, Mina Burns, Lei Brutus, Yaznairy Cabrera, Mary Beth Dato, Raquel Douglas, Maya Jasinska, Seha Karabacak, Daniel Mueller, and Ahna Pearson provided excellent research assistance. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

The Effect of Safety Net Generosity on Maternal Mental Health and Risky Health Behaviors
Lucie Schmidt, Lara Shore-Sheppard, and Tara Watson
NBER Working Paper No. 29258
September 2021
JEL No. I12,I38

ABSTRACT

A generous safety net may improve mental health outcomes and stress-related health behaviors for single mothers by promoting financial security, but stigma and hassle associated with welfare use could offset some of these gains. We use a simulated safety net eligibility approach that accounts for interactions across safety net programs and relies on changing policies across states and time to identify causal effects of safety net generosity on psychological distress and risky behaviors of single mothers. Our results suggest that a more generous safety net is protective of maternal mental health: we estimate that a $1000 increase to the combined cash and food benefit package reduces severe psychological distress by 5.5 percent. Breaking out effects by individual programs while still controlling for potential benefits from other programs, we find that this reduction is entirely due to simulated tax credit eligibility and appears to occur in the first half of the year, when such benefits are typically received. We find no significant effect of the overall safety net on risky behaviors like smoking and heavy drinking, but this masks offsetting effects of cash and food benefits, suggesting that the impact of improved financial resources depends on details of transfer program design.

Lucie Schmidt
Department of Economics
Smith College
Northampton, MA 01063
and NBER
lschmidt@smith.edu

Lara Shore-Sheppard
Department of Economics
Williams College
24 Hopkins Hall Drive
Williamstown, MA 01267
and NBER
lshore@williams.edu

Tara Watson
Department of Economics
Williams College
24 Hopkins Hall Drive
Williamstown, MA 01267
and NBER
tara.watson@williams.edu

I. Introduction

Low-income families headed by single mothers often face economic and social challenges. Perhaps as a result of stressful life circumstances, single mothers are significantly more likely to suffer from mental health problems and are more likely to engage in risky health behaviors such as smoking and heavy drinking (DeKlyen et al. 2006; Jun and Acevedo-Garcia 2007). Both maternal mental health problems and risky health behaviors are associated with negative children's outcomes (Case and Paxson 2002; Oyserman et al. 2002; Bernstein et al. 2005; Oyserman et al. 2005; Sabia 2008; Allen-Meares et al 2010; Kalliola et al. 2013, Rossow et al. 2016).

The social safety net is intended to ameliorate the effects of economic hardship for low-income families. However, the literature examining various safety net programs suggests mixed effects on mental health. For example, the Earned Income Tax Credit (EITC) and Medicaid have been shown to raise levels of maternal mental health (Evans and Garthwaite 2014; Boyd-Swan et al. 2016, Guldi and Hamersma 2020). Other work indicates that the Supplemental Nutrition Assistance Program (SNAP) is associated with increased psychological distress, particularly at the moment of transition onto the program (Heflin and Ziliak, 2008). Stress-related health behaviors such as smoking and heavy drinking may also be affected by the safety net. For example, the EITC has been shown to reduce smoking (Averett and Wang 2013; Cowan and Tefft 2012), but additional transfer income could allow families to purchase tobacco and alcohol.[1]

The literature to date typically focuses on one safety net program at a time. However, the US social safety net includes a number of different programs, and recipients of one program

[1] Tobacco and alcohol products cannot be purchased with SNAP benefits, so any effects of SNAP would be indirect.

often receive benefits from multiple other programs simultaneously. Furthermore, participation in one program may directly or indirectly reduce the benefits received from another. These complex inter-relationships across major safety net programs mean that analyses of one program in isolation may as a result yield biased estimates of program effects.

In this paper, we use a multi-program safety net calculator first introduced by Schmidt, Shore-Sheppard, and Watson (2016) that estimates eligibility and benefit levels for cash assistance programs (Temporary Assistance for Needy Families (TANF), and tax credits such as the EITC and Child Tax Credit (CTC)), food assistance through the Supplemental Nutrition Assistance Program (SNAP), and public health insurance through Medicaid and the Children's Health Insurance Program (CHIP).[2] This calculator fully accounts for interactions between these programs in eligibility and generosity. Using a simulated eligibility technique as in Currie and Gruber (1996) that allows us to isolate the effects of policy changes, we generate estimates of safety net generosity for single mother families using the Current Population Survey (CPS). We then merge those simulated benefits by state, year, and demographic cell to the restricted-access National Health Interview Survey (NHIS) to estimate causal effects of safety net generosity on the mental health and stress-related health behavior of single mothers.

We first show that our simulated safety net benefits strongly predict self-reports of safety net participation in the NHIS after controlling for individual characteristics, time-varying state characteristics, and state and year fixed effects. Our primary results suggest that a more generous safety net is protective of maternal mental health, such that a $1000 increase to the combined cash and food benefit package reduces severe psychological distress by 0.017 percentage point (5.5 percent of the mean). We then look at effects of individual safety net programs to examine

[2] For reasons discussed below, we focus on a sample of single mothers without work-limiting disabilities, so we do not include benefits from the Supplemental Security Income (SSI) program.

whether the benefits delivered by different programs have different impacts on maternal mental health. However, unlike most of the existing literature that examines individual programs in isolation, our estimates fully account for cross-program interactions in eligibility and benefit levels. For example, our estimated effects of SNAP account for the fact that eligibility for higher TANF benefits will reduce the SNAP benefits for which a family is eligible. We find that these reductions in maternal psychological distress are entirely due to simulated tax credit eligibility and appear to occur in the first half of the year, when such benefits are typically received. We estimate that an additional $1000 in tax credits would reduce severe psychological distress by 45 percent. We find no significant effects of higher SNAP or TANF benefits on maternal mental health.

We also examine the effects of safety net generosity on two risky health behaviors: daily smoking and heavy drinking. Our results suggest offsetting impacts of cash versus food benefits, where higher tax credits reduce the likelihood that the mother smokes every day and reduce the likelihood of heavy drinking among drinkers, but only in the first half of the year. SNAP generosity, on the other hand, appears to increase smoking and heavy drinking. The results suggest that program characteristics such as the frequency or ease of benefit receipt or stigma arising from participation may mediate the relationship between program generosity and mental health and health behaviors.

II. Background

Single parent families are more likely to live in poverty than families with married parents, and as a result face a number of challenges to well-being. The economic uncertainty that many face can lead to both mental health problems and risky health behaviors such as smoking and heavy drinking (Barnes and Smith 2009). Poor maternal mental health and risky health

behaviors have broad-ranging impacts within the family. For example, poor maternal mental health is associated with worse parenting behaviors (Oyserman et al. 2005), worse academic outcomes for children (Allen-Meares et al. 2010), and worse psychological outcomes for adolescents (Oyserman et al. 2002). Maternal smoking is associated with low birthweight (see for example, Sexton and Hebel 1984; Almond, Chay, and Lee 2005; Chen 2012) and children's respiratory ailments including asthma (e.g. Weitzman et al. 1990; Sabia 2008; Kalliola et al. 2013). Maternal heavy drinking is also associated with low birthweight (Chen 2012), and a range of other negative outcomes, including lower academic achievement (Scholder et al. 2014).

The safety net in the US operates through a number of interrelated programs. These include traditional cash transfer programs like TANF, refundable tax credits that are conditional on work like the EITC, food programs like SNAP, and health insurance programs like Medicaid. These programs would be expected to affect maternal mental health through several channels. First, additional cash and/or food benefits increase family income and reduce poverty. Increased resources along with the reduction in economic hardships may improve family well-being and maternal mental health (Yeung et al. 2002; Milligan and Stable 2011). On the other hand, factors such as internalized stigma or a stressful assistance application process could cause psychological distress associated with program participation (Heflin and Ziliak 2008). Public health insurance could increase access to diagnosis and treatment for mental health conditions, leading to higher or lower reported mental health concerns. Finally, mental health may be affected by a labor market channel. Most traditional cash transfer programs disincentivize work, but the EITC requires work and has been shown to increase the labor supply of single mothers (see, e.g. Eissa and Liebman 1996 and Meyer and Rosenbaum 2001; Eissa and Hoynes 2011 and

Guldi and Schmidt 2018 provide reviews of this literature). This increased labor force participation could directly affect maternal mental health in either direction.

In addition, qualitative research on the EITC suggests that it might have benefits for mental health that go beyond the direct effects associated with higher income. Halpern-Meekin et al. (2015) stress the enhanced sense of dignity and reduced stigma that EITC recipients receive. "[The EITC] confers dignity by confirming claimants' identities as workers, rather than marking them as dependents waiting for a government handout" (p. 19). The authors go on to note that "traditional means-tested benefits like cash welfare … and SNAP… are not designed to prevent families from experiencing scarcity. In contrast, [EITC recipients] enjoy a considerable surplus in the months following receipt of the tax refund" (p. 20). Income support provided through tax refunds allows recipients to pay off debts, to purchase a used car, or to move to a better neighborhood, and Halpern-Meekin et al. show that 4 of every 10 refund dollars are invested or saved.

Safety net programs could also affect risky behaviors such as maternal smoking and heavy drinking. The increase in resources associated with safety net transfers could facilitate the purchase of cigarettes and alcohol in addition to other goods. Conversely, increases in income have been shown to increase demand for healthy behaviors, which could reduce smoking and drinking (Averett and Wang 2012; Hoynes, Miller, and Simon 2015). Psychological distress can lead to smoking and heavy drinking as short-term outlets for stress reduction, so any of the mechanisms described above could affect smoking or drinking behavior (Pratt and Brody 2010; Prochaska et al. 2011; Cook et al. 2014; Sheals et al. 2016). Finally, increased labor supply induced by the EITC might reduce opportunities to smoke due to workplace bans on smoking (Hoynes, Miller, and Simon 2015).

A number of papers have examined the effects of individual safety net programs on maternal mental health. Ifcher (2011) and Herbst (2012) examine the impact of welfare reform and find some effects of welfare reform on measures of life satisfaction, although Herbst (2012) finds no significant effects on mental health. Oddo and Mabli (2015) find evidence that SNAP participation reduces psychological distress, and Munger et al. (2016) find that losing SNAP is associated with an increased probability of depression, although Heflin and Ziliak (2008) find that entry into SNAP is associated with negative effects on mental health. Guldi and Hamersma (2020) find that pregnancy-related Medicaid expansions significantly improve maternal mental health.

The most robust evidence on the effects of safety net programs on mental health comes from the Earned Income Tax Credit. Evans and Garthwaite (2014) look at Earned Income Tax Credit expansions that increased benefits for families with two or more children relative to families with one child and find that the expansions were associated with reduced maternal depression among these larger families. Boyd-Swan et al. (2016) find that an expansion in eligibility for the EITC improves mental health and happiness, while Lenhart (2019) finds that higher state EITC generosity leads to a reduction in suicides.

Higher EITC payments have also been shown to reduce smoking. Averett and Wang (2013) and Cowan and Tefft (2012) both exploit the 1993 policy change that increased benefits for families with two or more children relative to families with fewer children and find that higher benefit levels led to less smoking among mothers with lower levels of education. Hoynes, Miller and Simon (2015) show that the EITC improves infant health, with one of the mechanisms being reduced maternal smoking.

Hoynes and Schanzenbach (2016) note that the income effect of SNAP, by shifting out the family's budget constraint, could lead to behaviors that are detrimental for health like drinking and smoking, even though those goods cannot be purchased directly with SNAP benefits. While there is some evidence that the timing of SNAP payments over the month might affect purchases of alcohol (e.g. Castellari et al. 2017), we are unaware of prior literature that finds a causal relationship between SNAP benefits and smoking behavior.[3]

In sum, the existing literature finds mixed impacts of the safety net on mental health and risky behaviors. However, prior work generally does not account for the complex relationships across safety net programs.[4] The US safety net is a patchwork of programs, and many families receive benefits from multiple programs at once. For example, Schmidt, Shore-Sheppard, and Watson (2016) show that among a sample of low-income single parent families from 2002-2010 that are estimated to receive the EITC, 28.5 percent also report SNAP receipt, and 53.8 percent report at least one family member receiving health insurance through Medicaid.

In addition, US safety net programs interact in complex ways. Receipt of some programs provides categorical eligibility for other programs (for example, TANF confers eligibility for SNAP). In the other direction, benefits from some programs are considered countable income towards others; higher state TANF benefits reduce SNAP benefits for recipients of both programs, for example. As a result, analyses that focus on one program in isolation might lead to biased estimates of program benefits on outcomes. Our paper adds to the literature by examining

[3] Hastings and Washington (2010) find that while food expenditures decrease through the month from the time of SNAP benefit payment, alcohol and cigarettes experience a much smaller decline.

[4] Two exceptions are Schmidt, Shore-Sheppard, and Watson (2016), which accounts for interactions between the same programs we examine here and finds that a more generous safety net significantly reduces food insecurity among low-income single parent households, and McKernan, Ratcliffe, and Braga (2021), which finds that the combined effect of SNAP, TANF, and Medicaid reduces material hardships.

the effects of the full package of safety net programs on mental health, smoking, and heavy drinking, accounting for interactions among major benefit programs.

III. Methodology

Our work builds directly on the multi-program safety net eligibility and potential benefit calculator developed by Schmidt, Shore-Sheppard, and Watson (2016). We take a fixed population sample (described below) and run it through a series of programs calculating eligibility and the potential dollar value of benefits for families, assuming full take-up of all programs for which a family is eligible. The calculator used for this analysis covers policy years 1998-2016, and includes the most important cash, food, and health care safety net programs available nationally. The cash programs include Temporary Assistance to Needy Families (TANF), which provides cash support to low-income families with children with either a single parent or an unemployed parent, the Earned Income Tax Credit (EITC), which includes both the refundable federal tax credit for low-income families with earned income as well as corresponding state EITCs, and the Child Tax Credit (CTC), a partially refundable per-child tax credit. The Supplemental Nutrition Assistance Program (SNAP) provides food assistance, and Medicaid and the Children's Health Insurance Program provide health insurance to children and some adults in low-income families.[5]

The safety net calculator incorporates the program rules for each state and year, accounting for all interactions between programs. The first step in the calculator is to estimate

[5] The calculator used in Schmidt, Shore-Sheppard and Watson (2016) also estimated potential cash benefits from Supplemental Security Income (SSI), which would provide income support to those with work-limiting disabilities. However, in our data the presence of a work-limiting disability is indicated by an affirmative answer to a question about whether physical, mental, or emotional problems limit the work an individual can do. As a result, this measure is correlated with our key variable of interest, mental health. As a result, we chose to focus in this paper on the sample of single mothers without work-limiting disabilities, so predicted SSI benefits are equal to zero.

federal and state Earned Income Tax Credits and the Child Tax Credit by running family-level survey data through the TAXSIM program at the National Bureau of Economic Research (Feenberg and Coutts 1993). The data with the EITC and CTC estimates attached are then run through a TANF calculator to determine the family's potential TANF benefits. The data are then run through a program to estimate Medicaid and CHIP eligibility for each individual in the family, and are finally run through a program that estimates eligibility and benefits for SNAP. Data inputs to the calculator for our sample of families headed by non-immigrant single mothers without disabilities include: mother's earnings, employment status, number and ages of children, state of residence, and year.

The calculator allows us to impute benefit dollars from EITC/CTC, TANF, and SNAP, and to calculate public health insurance eligibility for any given family. However, using these imputed benefits as independent variables yields significant endogeneity concerns. For example, holding program rules constant, more families would qualify for benefits in an economic downturn, and we might also expect mental health to worsen with poor economic conditions. To deal with these issues, we employ a common simulated eligibility technique first used by Currie and Gruber (1996) and exploited in related work by Schmidt, Shore-Sheppard, and Watson (2016). The simulated eligibility approach imputes benefits for a sample of families that remains fixed across all states and years. Benefits are thus solely a function of safety net generosity by state, year, and demographic cell and are unrelated to individual responses to economic conditions or to policy generosity.

Though the primary analysis sample is the National Health Interview Survey, the income variable available in the NHIS includes unearned income, which would include any transfer income received by the family. It is therefore impossible to reliably impute program eligibility in

the NHIS. As a result, we use a second data set, the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC), to generate simulated eligibility measures at the state, year, and demographic cell level.

To obtain a simulated benefit measure in each state, year, and demographic cell, we create a fixed sample by removing state and year identifiers from the 1997-2013 CPS-ASEC data and iteratively assigning the entire national sample for the full set of years to each state for each policy year from 1998 to 2016. That is, our fixed simulated sample includes respondents from all states for the full set of CPS years 1997-2013).[6] We then run this fixed simulated sample through the multi-program safety net calculator for each state and year, using the policy rules for each state that are in effect for the majority of the prior calendar year. Once we have calculated predicted eligibility and benefit levels for individuals in the sample based on their simulated state and year, we calculate mean predicted eligibility and benefit levels by demographic cells for families headed by a single mother. Cells are defined by whether there was a child under the age of 6, whether there was more than one child, and mother's education in four categories. Safety net generosity is then summarized by the mean dollar value of cash and food safety net benefits in a state-year-demographic cell. By construction, this generosity measure is only related to state policy differences across cells and over time, and not to local economic conditions or to the economic circumstances of an individual family. We then merge simulated benefit generosity to the NHIS data by state-year-demographic cell.

[6] We only use CPS data through 2013 due to a redesign of the income questions beginning in 2014. The 2014 survey used a split sample design where respondents received one of two possible sets of survey questions. To have a consistent measure of income throughout the simulated sample, we used years 1997 to 2013 to generate the pool of individuals who were run through the safety net calculator. Additional details on sample construction are found in the Data section below.

We first examine whether simulated safety net generosity is associated with reported safety net participation in the NHIS:

$$participation_{icst} = \beta_0 + \beta_1 benefit_{cst} + X_{icst}\alpha + state\_char_{ist}\delta + \theta_s + \gamma_t + \mu_{icst} \quad (1)$$

In this equation *participation* is an indicator of program participation of family *i* in demographic cell *c* in state *s* in year *t*; *benefit* is the mean dollar amount of safety net generosity for demographic cell-state-year, broken out by cash and food benefits, *X* is a vector of individual level controls that includes age of the mother, the number of children in the household (in two categories: one vs. two or more) and whether there was a child under the age of 6, urban residence, education in four categories, and race/ethnicity in four categories (non-Hispanic white, non-Hispanic Black, Hispanic, and Asian/Native American/Pacific Islander), as well as interactions between race and all individual level variables listed above. *State_char* is a vector of state level variables that includes the unemployment rate, the dependent allowance for Unemployment Insurance (UI), dollars spent on child support enforcement per capita, and the number of public housing units and vouchers per capita.[7] The regression also controls for state and year fixed effects, and robust standard errors are clustered at the state level. Our primary measure of welfare participation is self-reported welfare participation in any programs: TANF, SNAP, Medicaid, or CHIP.[8] We also examine self-reports of participation in individual programs in the Appendix.

[7] Results are robust to a more extensive set of state policy controls that adds the number of weeks of UI extended coverage, the presence of a TANF family cap, TANF asset limits, TANF strict time limits, the state minimum wage, and the share of TANF dollars spent on basic assistance and child care and work activities. There are also a number of SNAP policy options that varied across states over our time period (Ganong and Liebman 2018). Many of these, including broad-based categorical eligibility, waivers for able-bodied adults without dependents, and the combined application project for SSI recipients, were unlikely to have large effects on our sample population of low-income single mothers without disabilities.

[8] Our measure of welfare participation also includes participation in SSI and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), but these programs are not included in the simulated eligibility calculator.

After establishing that our simulated safety net generosity measures are predictive of reported safety net participation in the NHIS as expected, we next examine how simulated benefits affect the key outcomes of interest, maternal mental health, smoking, and heavy drinking. We estimate the equation:

$$outcome_{icst} = \beta_0 + \beta_1 benefit_{cst} + X_{icst}\alpha + state\_char_{ist}\delta + \theta_s + \gamma_t + \mu_{icst} \quad (2)$$

where the set of outcomes are the mental health, smoking, and drinking measures defined below and our main variable of interest is *benefit*, the average potential value of benefits for the various safety net programs for which families in that demographic cell would be imputed to be eligible. The controls are as defined above, and thus the model controls for observable characteristics of families living in states in a given year, all time-invariant state characteristics, time-varying economic conditions, and year-to-year national variation in maternal mental health or risky behaviors. Results will tell us to what extent generous safety net benefits ameliorate mental health issues and affect risky behaviors.

III. Data

We use individual level data from two primary sources in this project. The first is the National Health Interview Survey from 1999 to 2016 with state identifiers, accessed at the Research Data Center at the National Center for Health Statistics. We begin with the sample adult files, and then merge in data from the person, household, and family files. Our sample consists of non-immigrant single mothers without work-limiting disabilities. Summary statistics for demographics, welfare participation, and our outcomes of interest are presented in Table 1. Approximately 34 percent of the single mothers in our sample report receipt of at least one program, with SNAP being the program with the most extensive participation, at 24 percent.

For maternal mental health, we use responses to a series of questions asked by the NHIS to create a standard Kessler-6 (K6) indicator of psychological distress (Kessler et al. 2010). Respondents are asked six questions about how often in the past 30 days they felt: so sad that nothing could cheer them up; nervous; restless; hopeless; that everything was an effort; and worthless. For each question, responses include all of the time, most of the time, some of the time, a little of the time, or none of the time. Each all of the time response receives 4 points, most of the time receives 3, some of the time receives 2, a little receives 1 and never receives zero. The points are summed over the six questions to create a K6 index that ranges from 0 to 24. The K6 index is most commonly used to identify severe psychological distress (K6> =13). However, Prochaska et al. (2012) note the importance of identifying more moderate psychological distress (K6>=5 & K6<=12) that would still justify medical intervention. We examine severe and moderate psychological distress separately.

We also examine smoking and heavy drinking behavior. The NHIS asks "Do you NOW smoke cigarettes every day, some days, or not at all?" We create an indicator variable if the mother answers that she smokes every day. About 22 percent of the sample smokes daily. The NHIS question on heavy drinking is only asked of those who drank at least once in the past year, and asks if in the last year the respondent ever drank 4 or more drinks in one day.

Our second primary data set is the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC). The CPS contains key information on demographic characteristics (including marital status, number and age of children, disability status, and so on), and income, which allows us to impute eligibility and benefits for safety net programs. We use this information to assess the likely eligibility and benefits for individuals with a given set of demographic characteristics given the policies in place for each state and year.

As described above, we generate a simulated sample by using all reference persons in the Current Population Survey from 1997-2013 that are unmarried women aged 18-64 with at least one child under 19 living with them. Children older than 23 are not considered part of the family unit. We drop families with no valid income measure, and we drop families with any immigrants (non-citizens or naturalized citizens) as the safety net rules for immigrants are complex.

We calculate several different safety net benefit variables. We first use an overall measure of total cash and food benefits combined, and then break out cash and food program benefits separately. We also look specifically at individual programs – tax credits (including the CTC and both state and federal EITCs), TANF, and SNAP. Rather than monetize the value of health insurance, we create a variable that indicates the share of the family that is eligible for Medicaid. In all specifications, we account for cross-program interactions in determining the simulated benefit amounts. As described above, we then merge these safety net measures to the NHIS by state, year, and demographic cell. Table 2 illustrates the values for these simulated benefit levels (in thousands of real 2016 dollars), both for the full NHIS sample and separately by year. The average single mother family in our sample is predicted to be eligible for $1,886 in TANF benefits, $1,812 in SNAP, and $2,049 in tax credits. The total cash and food package remained roughly constant between 1998 and 2016, but this masks differential trends over time (with benefits increasing during the Great Recession) and across programs (tax credits and SNAP are increasing while TANF is decreasing).

While Table 2 shows the variation across time and program, it does not illustrate the other sources of variation we use – across states and demographic cells. Figure 1 illustrates the imputed value of the full cash and food package by state and year, with trends highlighted for the three largest states of California, New York, and Texas. It illustrates large differences in levels

among states (California and New York have much higher levels of benefits than Texas), and shows the increase in benefits across all states due to the American Recovery and Reinvestment Act of 2009. However, it also shows policy-induced variation within states at different points in time. Figures 2 and 3 look separately at cash benefits (Figure 2, including TANF and tax credits) and food (SNAP) benefits (Figure 3). There is much more within-state variation in the cash benefits, which is unsurprising given that SNAP generosity is set at the federal level, and most state variation in generosity for the simulated sample comes from differences in unearned income generated by differential TANF generosity. Figures 4 and 5 further break out cash benefits into TANF and tax credits. In general, TANF benefits are trending down over our time period, while tax credits are rising.

Since the bulk of our tax credit measure reflects the federal EITC and CTC, Figure 5 shows relatively little within-state variation in tax credits for the three largest states, although a number of states increased their state EITCs during our sample period. However, Figures 6 and 7 illustrate that there is substantial variation in tax credits across demographic categories. (These figures are for the state of California as an example, but similar cross-demographic-cell variation exists in all states). Figure 6 shows, for high school graduates, variation based on the number of children. Families with 2 or more children have higher imputed tax benefits than families with one child, and show larger policy-induced increases in benefits over this time period. This variation has been used by many other papers examining the effects of the Earned Income Tax Credit, including Evans and Garthwaite (2014) and Hoynes, Miller, and Simon (2015). Figure 7 illustrates variation by educational attainment of the household head in imputed tax credits, holding family demographics fixed with two or more children with at least one under the age of 6. Differences by educational attainment largely stem from the ways in which differences in

earned income by educational category interact with the tax code. The moderate earnings of high school graduates and those with some college are likely to generate the highest tax credits. The lower average earnings of single mothers without a high school degree mean that women in that category are more likely to be on the phase-in range of the EITC and therefore to receive lower benefits, while the higher average earnings of college graduates mean they are less likely to be eligible at all.

Our state level control variables come from a number of different sources. The unemployment rate comes from the Bureau of Labor Statistics. The dependent allowance for Unemployment Insurance comes from the US Department of Labor Employment and Training Administration. Dollars spent on child support enforcement come from the Department of Health and Human Services Office of Child Support Enforcement, and the number of public housing units and vouchers come from the Department of Housing and Urban Development. These last two items are converted to per capita measures by dividing by state level population counts from the US Census Bureau.

IV. Results

We first estimate equation (1), examining the effects of our simulated safety net benefit variables on reported welfare participation in the NHIS, with results reported in Table 3. Panel A shows that combined simulated cash and food benefits significantly predict self-reported welfare participation. The estimate suggests that each additional $1000 of real cash and food benefits increases the probability of reporting any safety net participation by approximately 2 percentage points. In panel B we show the estimated effects for benefits delivered in the form of cash and the estimated effects for SNAP, continuing to account for cross-program interactions in

determining the simulated benefit amounts. Our estimates indicate that both cash and food benefits are significant predictors of participation, but the magnitude of the SNAP benefit impact is larger (estimated coefficient of 0.048 relative to 0.014). In Panel C we show the estimated effects for the individual programs, again accounting for cross-program interactions. SNAP continues to have a significant effect on reported welfare participation, and simulated tax credits, simulated TANF, and simulated Medicaid eligibility are also strongly predictive of self-reported program participation.

In Appendix Table 1, we re-estimate these models using reported receipt of individual programs instead of overall welfare participation as our dependent variable. Columns 1-3, for TANF, SNAP, and Medicaid respectively, show results that are consistent with the results in Table 3 and with our simulated benefits affecting reported participation in ways that would be expected. Simulated TANF benefits predict participation in TANF, simulated SNAP benefits predict participation in SNAP, and a greater fraction of the family being eligible for Medicaid predicts Medicaid receipt (although the estimates are less precise for Medicaid). These tables also demonstrate the importance of accounting for multiple program interactions, as more generous benefits from one program in several cases predict participation in another, particularly SNAP and Medicaid.[9]

In Table 4, we examine the effects of simulated safety net benefit generosity on maternal mental health, analyzing severe psychological distress (SPD) in Column 1 and moderate psychological distress (MPD) in Column 2. Panel A, Column 1 shows that that the total cash and food benefit package reduces maternal SPD, and this effect is statistically significant at the 10

[9] As a placebo test for our safety net calculators, we examined whether simulated safety net benefit generosity affected SSI participation in our sample of single mothers without disabilities, and found no effect. Results available from authors on request.

percent level. Panel B shows that this effect is entirely driven by cash benefits, not SNAP. Panel C breaks out the effects of individual programs and further shows that the protective effect of the safety net on severe psychological distress is primarily limited to tax credits. A $1000 increase in tax credits would reduce SPD by 0.7 of a percentage point, or a 22.5 percent reduction off of the baseline mean of 3.1 percent. Though not directly comparable, Evans and Garthwaite (2014) find that a $1000 increase in EITC payments reduces the number of bad mental health days by 38 percent. We find no significant effects of SNAP or TANF on SPD. In Column 2, we find no significant effects of simulated safety net generosity on MPD.

We next examine the effect of safety net generosity on maternal daily smoking and heavy drinking, in Table 5. The point estimates on the overall cash and food benefit package are negative for both the likelihood that the mother reports smoking every day (Column 1) and heavy drinking (Column 2), although these coefficients are small in magnitude and not significantly different from zero. Breaking out cash from food benefits in Panel B shows that the effects of these two different types of benefits go in different directions. Higher cash benefits lead to a statistically significant reduction in the likelihood of smoking, while higher SNAP benefits lead to a statistically significant increase. Panel C shows that the cash effect, like the effect on severe psychological distress, is entirely driven by tax credits. A $1000 increase in tax credits is estimated to reduce smoking by 3.3 percentage points, or a 14.2 percent decrease from the baseline mean of 22.3 percent. A similarly sized increase in SNAP benefits would increase smoking by about half as much (1.7 percentage points, or a 7.6 percent increase). TANF benefits show no relationship with smoking behavior. Our results on the EITC are consistent with previous work by Averett and Wang (2013), Cowan and Tefft (2012), and Hoynes, Miller and Simon (2015). To our knowledge, we are the first to find that higher SNAP benefits lead to

significant increases in smoking. Results for heavy drinking among drinkers in Column 2 show a very similar pattern of effects, but are both less precisely estimated and show smaller effect sizes relative to the larger baseline mean.

Given that many of our findings seem to be driven by tax credits, and these tax credits are usually received as a refund between the months of February and April, we re-estimate all of our equations separately for respondents interviewed in the first half versus the second half of the year. Summary statistics by half year are presented in Appendix Table 2 and show that observable characteristics are quite similar for respondents interviewed in the first half versus the second half of the year. Results for psychological distress can be found in Table 6. Columns 1 and 2 show that the effects of simulated safety net generosity on SPD found in Table 4 occur entirely in the first half of the year, when tax refunds are likely to occur. An increase in imputed tax credits of $1000 would reduce SPD by 1.4 percentage points, or roughly half of the baseline rate of 3.9 percent. Furthermore, when we break out the sample in this way, we now find that tax refunds significantly reduce MPD as well, but only for those interviewed in the first half of the year. The effect in the first half of the year (Column 3) shows a decrease of 1.9 percentage points, on a mean of 19.7 percent.

Table 7 breaks out effects on smoking and drinking by respondents' interview date. Results in Panel A Columns 1 and 2 show that more generous cash and food benefits combined lead to a small but statistically significant reduction in smoking, but in the first half of the year only. The estimated coefficient suggests that a $1000 increase in overall generosity would reduce smoking by 0.6 percentage points (on a baseline of 22.9 percent). Panel B shows that negative effects of cash benefits are offset by positive effects of SNAP benefits. When individual programs are broken out in Panel C, in Columns 1 and 2 we see that the reductions in smoking

caused by higher tax credits occur only in the first half of the year, but that the increase in smoking associated with SNAP generosity happens regardless of the timing of the interview.

Columns 3 and 4 show an overall reduction in heavy drinking among drinkers in the first half of the year (Panel A, a reduction of 1.5 percentage points on a baseline of 36.9 percent) that is primarily driven by cash benefits (Panel B). Panel C shows effects of similar magnitudes for tax credits and TANF, although only the TANF coefficient is statistically different from zero. Column 4 shows no significant overall effect of the safety net on heavy drinking in the second half of the year, but this appears to be due to effects of SNAP and tax credits going in opposite directions. Higher imputed SNAP benefits significantly increase heavy drinking in the second half of the year only, while the estimated negative coefficient on tax credits is similar in magnitude to that found for the first half of the year found in Column 3. Overall, the results by half year indicate that tax credit effects are concentrated in the first half of the year, consistent with the typical timing of tax credit arrival.

V. Discussion and Conclusions

Using a simulated eligibility approach to assess causal effects, we find that a more generous cash safety net is protective of maternal mental health. Specifically, more generous tax credit support (taking into account all other benefits for which the family is eligible) is associated with lower levels of moderate and severe psychological distress among single mothers. This mental health improvement is particularly evident for respondents interviewed in the first two quarters of the year, the quarters when tax credits are most likely to be received. We find no significant effects of either SNAP or TANF generosity on psychological distress. While we find no significant effect of the overall safety net on risky behaviors like smoking and heavy drinking,

there are offsetting effects of cash and food benefits. Specifically, tax credits reduce smoking and heavy drinking, while SNAP benefits are positively linked to these risky behaviors, with coefficients that are more precisely estimated for smoking than for drinking.

Both EITC and SNAP increase resources available to families, but they appear to have differential impacts on mental health and health behaviors. A full understanding of the differential effects of EITC and SNAP is beyond the scope of this paper, but we note some key differences between the programs. First, unlike SNAP or TANF, the EITC is a program that incentivizes work for single mothers, potentially enhancing social networks and self-esteem (Elliot 1996, Halpern-Meekin et al. 2015). Bans on smoking in the workplace could also reduce opportunities for smoking. Farrelly et al. (1999) note that by the early 1990s, 82 percent of indoor workers faced some restrictions on smoking in the workplace. However, these factors would be expected to operate throughout the year rather than in just the first two quarters, so the results presented here are not consistent with the effect arising primarily through work incentives. Second, the EITC leads to a short-term boost in financial well-being, which appears be accompanied by a short-term reduction in psychological distress. Monthly SNAP benefits may not yield the same impact as individual reference points adjust. Third, the resource benefits associated with SNAP may be offset by internalized stigma or a stressful application process, which is not evident in the EITC. This was the explanation offered for worsening mental health associated with initial SNAP participation in Heflin and Ziliak (2008), and could also explain the effects on smoking (and to a lesser extent drinking) apparent here.

Overall, our results suggest that a stronger safety net may be protective of maternal mental health among some of society's most vulnerable members—single mothers—but that the effects depend on the form of safety net programs. The EITC appears to benefit the

psychological well-being of mothers, whereas SNAP does not have the same impact. Though not testable directly, our results are consistent with the notion that program stigma or "ordeal mechanisms" may offset mental health benefits associated with increased resources. These findings are worthy of further exploration, and suggest that the form of the temporary expansion of the Child Tax Credit enacted as part of the American Rescue Plan in 2021 may have beneficial effects on maternal mental health, daily smoking, and heavy drinking, with ensuing benefits for children.

References

Allen-Meares, P., J. Blazevski, D. Bybee, and D. Oyserman. (2010). "Independent Effects of Paternal Involvement and Maternal Mental Illness on Child Outcomes." *Social Service Review* 84(1): 103-127.

Almond, D., K.Y. Chay, and D.S. Lee. (2005). "The Costs of Low Birth Weight", *The Quarterly Journal of Economics*, 120(3): 1031–1083.

Barnes M.G. and T.G. Smith. (2009). "Tobacco use as response to economic insecurity: Evidence from the National Longitudinal Survey of Youth." *The B.E. Journal of Economic Analysis & Policy* 9(1): Article 47.

Bernstein I.M., J.A. Mongeon, G.J. Badger, L. Solomon, S.H. Heil, S.T. Higgins. (2005). "Maternal smoking and its association with birth weight." *Obstetrics and Gynecology* 106(5):986-91.

Bitler, M. (2015). "The Health and Nutrition Effects of SNAP: Selection into the Program and a Review of the Literature on its Effects." In *SNAP Matters: How Food Stamps Affect Health and Well Being*. J. Bartfeld, C. Gundersen, T. Smeeding and J. P. Ziliak. Eds., Stanford, CA, Stanford University Press: 134-160.

Boyd-Swan, C., C. M. Herbst, J. Ifcher, and H. Zarghamee. (2016). "The earned income tax credit, mental health, and happiness." *Journal of Economic Behavior & Organization*, 126, 18-38.

Case, A. and C. Paxson. (2002). "Parental Behavior and Child Health." *Health Affairs*, 21(2).

Chen, J-H. (2012). "Maternal Alcohol Use during Pregnancy, Birth Weight and Early Behavioral Outcomes." *Alcohol and Alcoholism*, 47(6): 649–656.

Child Trends Databank. (2014). *Parental Smoking*. Available at: https://www.childtrends.org/wp-content/uploads/2016/03/indicator_1459306159.486.pdf

Cook, B. L., G. F. Wayne, E. N. Kafali, Z. Liu, C. Shu, and M. Flores. (2014). "Trends in Smoking Among Adults With Mental Illness and Association Between Mental Health Treatment and Smoking Cessation." *Journal of the American Medical Association* 311(2).

Currie, J., and J. Gruber. (1996). "Health Insurance Eligibility, Utilization of Medical Care, and Child Health." *Quarterly Journal of Economics* 111(2):431–66.

DeKlyen, M., J. Brooks-Gunn, S. McLanahan, and J. Knab. (2006). "The Mental Health of Married, Cohabiting, and Non–Coresident Parents With Infants." *American Journal of Public Health*: 96(10): 1836-1841.

Eissa, N. and H. Hoynes. (2011). "Redistribution and Tax Expenditures: The Earned Income Tax Credit." *National Tax Journal* 64 (2): 689–729.

Eissa, N. and J. B. Liebman. (1996). "Labor Supply Response to the Earned Income Tax Credit." *Quarterly Journal of Economics* 111 (2): 605–37.

Elliott, M. (1996). "Impact of Work, Family, and Welfare Receipt on Women's Self-Esteem in Young Adulthood." *Social Psychology Quarterly* 59(1): 80-95.

Evans, W. N. and C. L. Garthwaite. (2014). "Giving Mom a Break: The Impact of Higher EITC Payments on Maternal Health." *American Economic Journal: Economic Policy* 6(2): 258-290.

Feenberg, D.R. and E. Coutts. (1993). "An Introduction to the TAXSIM Model." *Journal of Policy Analysis and Management* 12(1): 189-194.

Ganong, P. and J. B. Liebman. (2018). "The Decline, Rebound, and Further Rise in SNAP Enrollment: Disentangling Business Cycle Fluctuations and Policy Changes." *American Economic Journal: Economic Policy* 10(4): 153-176.

Gregory, C. A. and P. Deb. (2015). "Does SNAP Improve your Health?" *Food Policy* 50: 11-19.

Guldi, M. and S. Hamersma. (2020). "The Effects of Pregnancy-Related Medicaid Expansions on Maternal, Infant, and Child Health." Working Paper.

Guldi, M. and L. Schmidt. (2018). "Taxes, Transfers, and Women's Labor Supply." In *Handbook on Women and the Economy*, S. L. Averett, L. M. Argys, and S. D. Hoffman, Eds., Oxford University Press.

Halpern-Meekin, S., K. Edin, L. Tach, and J. Sykes. (2015). *It's Not Like I'm Poor: How Working Families Make Ends Meet in a Post-Welfare World*. Oakland: University of California Press.

Heflin, C. M. and J. P. Ziliak. (2008). "Food Insufficiency, Food Stamp Participation, and Mental Health." *Social Science Quarterly* 89(3): 706-727.

Herbst, C. M. (2013). "Welfare Reform and the Subjective Well-Being of Single Mothers." *Journal of Population Economics*, 26(1), 203-238.

Hoynes, H. and D. W. Schanzenbach. (2016). "US Food and Nutrition Programs," in *Economics of Means-Tested Transfer Programs in the United States, Volume 1*, R. A. Moffitt, Ed., Chicago: University of Chicago Press.

Hoynes, H., D. Miller, and D. Simon. (2015). "Income, the Earned Income Tax Credit, and Infant Health." *American Economic Journal: Economic Policy*, 7(1): 172-211.

Ifcher, J. (2011). "The Happiness of Single Mothers after Welfare Reform." *The B.E. Journal of Economic Analysis & Policy* 11(1): Article 60.

Kalliola, S., A. S. Pelkonen, L. P. Malmberg, S. Sarna, M. Hamalainen, I. Mononen, and M.J. J. Makel. (2013). "Maternal smoking affects lung function and airway inflammation in young children with multiple-trigger wheeze." *Journal of Allergy and Clinical Immunology* 131(3).

Kessler, R. C., J. G. Green, M. J. Gruber, N. A. Sampson, E. Bromet, M. Cuitan, T. A. Furukawa. (2010). "Screening for Serious Mental Illness in the General Population with the K6 Screening Scale: Results from the WHO World Mental Health (WMH) Survey Initiative." *International Journal of Methods in Psychiatric Research* 19(S1): 4-22.

Lenhart, O. (2019). "The Effects of State-Level Earned Income Tax Credits on Suicides." *Health Economics*, 28(12): 1476-1482.

McKernan, S-M, C. Ratcliffe, and B. Braga. (2021). "The Effect of the US Safety Net on Material Hardship Over Two Decades." *Journal of Public Economics* 197.

Meyer, B. D. and D. T. Rosenbaum. (2001). "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers." *Quarterly Journal of Economics* 116 (3): 1063–1114.

Munger, A.L., S.L. Hofferth, and S.K. Grutzmacher. (2016). "The Role of the Supplemental Nutrition Assistance Program in the Relationship between Food Insecurity and the Probability of Maternal Depression." *Journal of Hunger and Environmental Nutrition* 11(2): 147-161.

Oddo, V.M. and J. Mabli. (2015). "Association of Participation in the Supplemental Nutrition Assistance Program and Psychological Distress." *American Journal of Public Health* 105(6).

Oyserman, D., D. Bybee, and C.T. Mowbray. (2002). "Influences of Maternal Mental Illness on Psychological Outcomes for Adolescent Children." *Journal of Adolescence* 25: 587-602.

Oyserman, D., D. Bybee, C.T. Mowbray, and T. Hart-Johnson. (2005). "When Mothers Have Serious Mental Health Problems: Parenting as a Proximal Mediator." *Journal of Adolescence* 28(4):443–63.

Pratt, L.A. and D.J. Brody. (2010). "Depression and Smoking in the U.S. Household Population Aged 20 and Over, 2005–2008." NCHS Data Brief #34.

Prochaska, J. J. (2011). "Smoking and Mental Illness — Breaking the Link." *New England Journal of Medicine* 365(3).

Prochaska, J. J., H-Y. Sung, W. Max, Y. Shi, and M. Ong. (2012). "Validity Study of the K6 Scale as a Measure of Moderate Mental Distress Based on Mental Health Treatment Need and Utilization." *International Journal of Methods in Psychiatric Research* 21(2): 88-97.

Rossow, I., L. Felix, P. Keating, and J. McCambridge. (2016). "Parental Drinking and Adverse Outcomes in Children: A Scoping Review of Cohort Studies." *Drug and Alcohol Review* 35: 397-405.

Sabia, J. (2008). "Every Breath You Take: The Effect of Postpartum Maternal Smoking on Childhood Asthma." *Southern Economic Journal* 75(1): 128-158.

Schmidt, L., L. Shore-Sheppard and T. Watson. (2016). "The Effect of Safety Net Programs on Food Insecurity." *Journal of Human Resources* 51(3): 589-614.

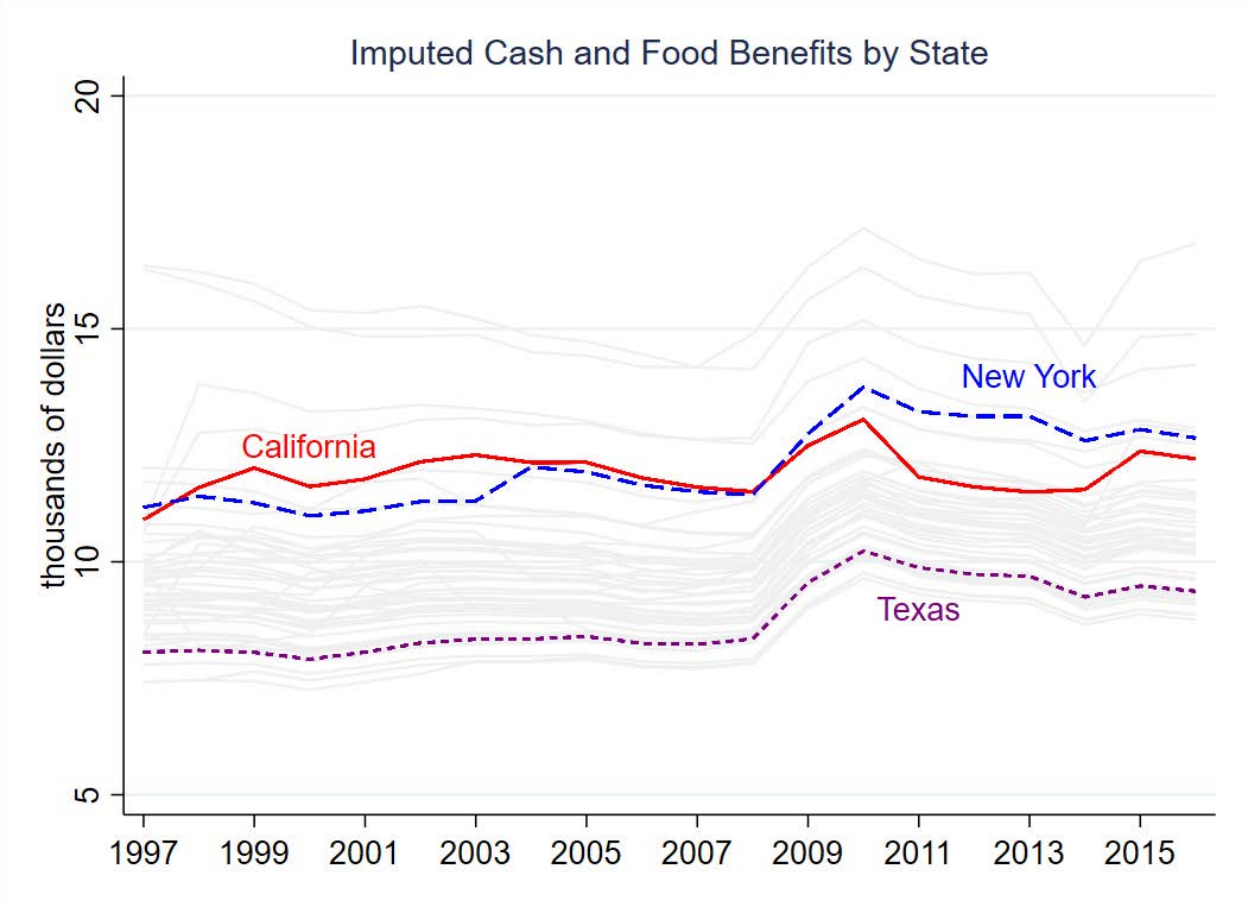
Scholder, S.H.K., G.L. Wehby, S. Lewis, and L. Zuccolo. (2014). "Alcohol Exposure In Utero and Child Academic Achievement." *Economic Journal* 124(576): 634-667.

Sexton M. and J.R. Hebel. (1984). "A Clinical Trial of Change in Maternal Smoking and Its Effect on Birth Weight." *Journal of the American Medical Association* 251(7):911–915.

Sheals, K. I. Tombor, A. McNeill, and L. Shahab. (2016). "A Mixed-Method Systematic Review and Meta-Analysis of Mental Health Professionals' Attitudes Toward Smoking and Smoking Cessation among People with Mental Illnesses." *Addiction* 111: 1536–1553.

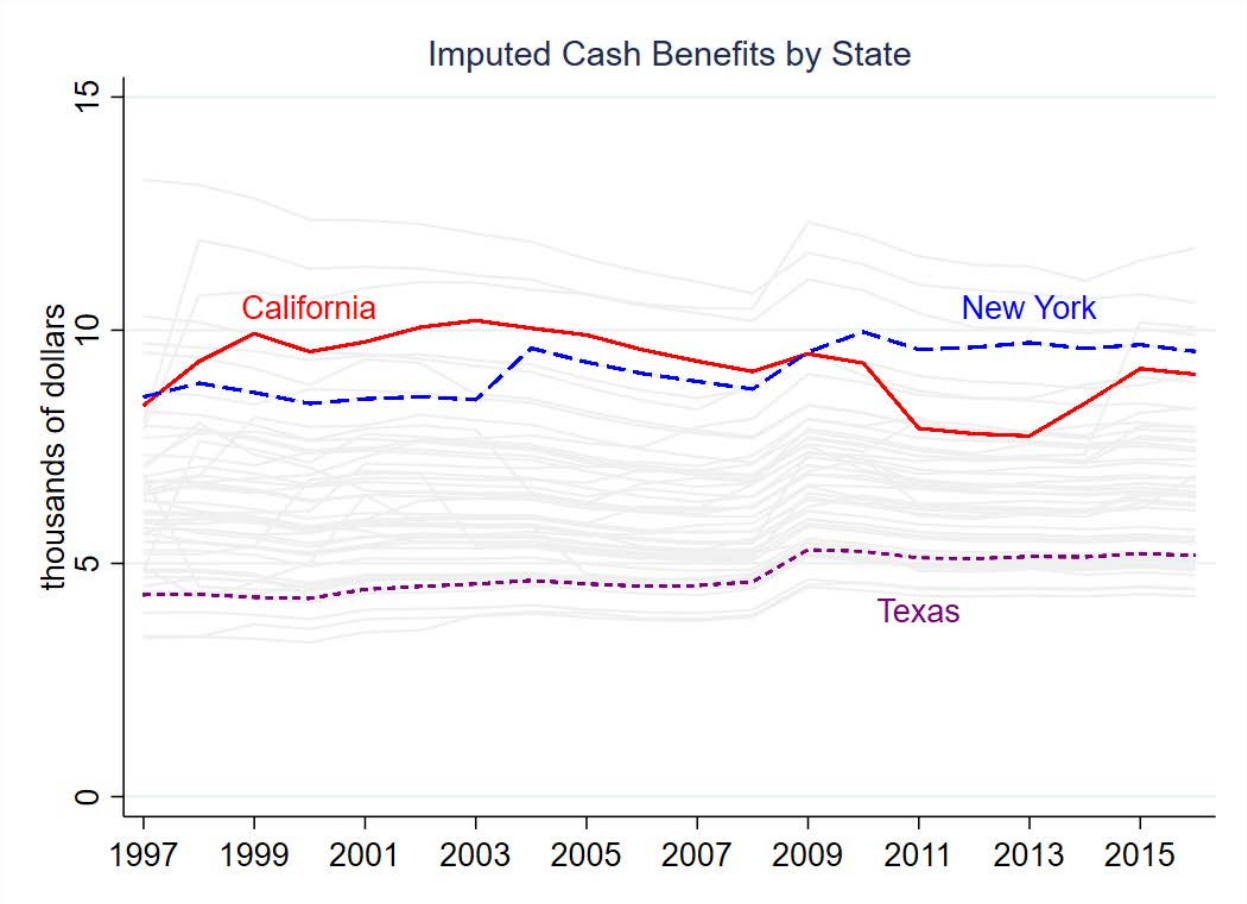
Weitzman, M., S. Gortmaker, D.K.Walker and A. Sobol. (1990). "Maternal Smoking and Childhood Asthma." *Pediatrics* 85 (4): 505-511.

Figure 1: Imputed Cash and Food Benefits by State, 1997-2016



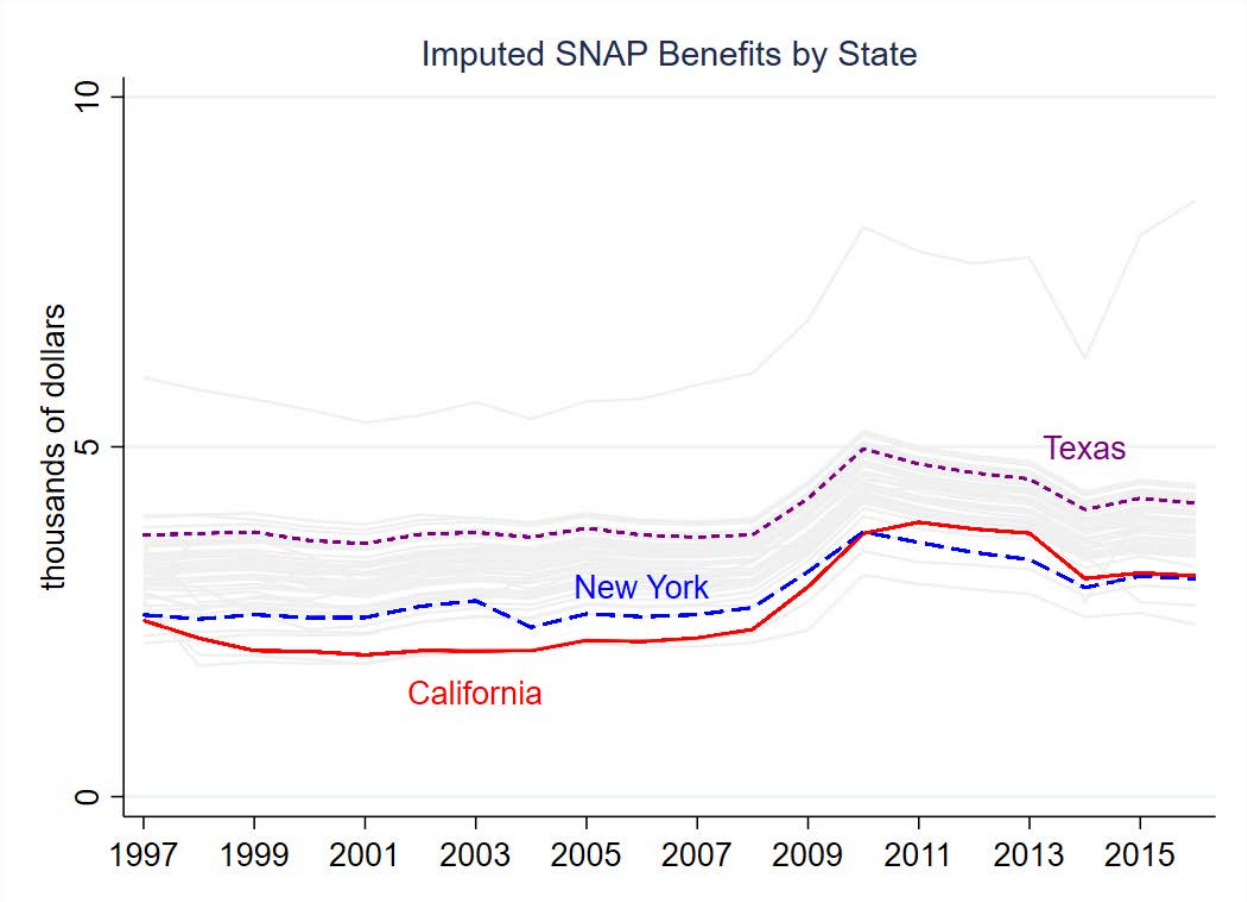
Notes: Figure illustrates average imputed total cash and food benefits (including TANF, EITC, CTC, and SNAP) in thousands of dollars by state for a simulated sample of single parent families with 2 or more children where one is under the age of 6 and household head is a high school graduate. The three largest states (California, New York, and Texas) are highlighted. Differences across states and over time stem from state and federal policy variation and their interactions.

Figure 2: Imputed Cash Benefits by State, 1997-2016



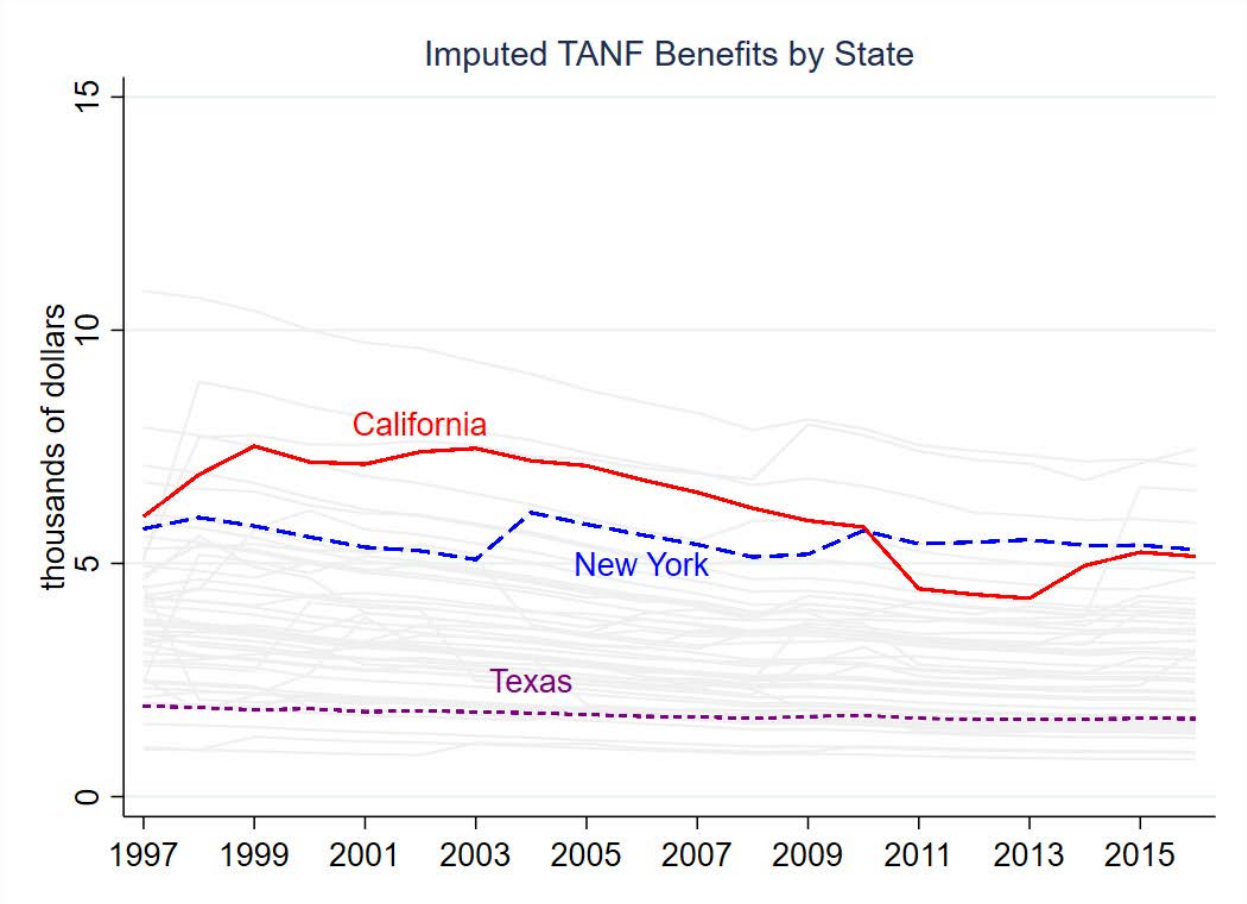
Notes: Figure illustrates average imputed cash benefits (including TANF, EITC, and CTC) in thousands of dollars by state for a simulated sample of single parent families with 2 or more children where one is under the age of 6 and household head is a high school graduate. The three largest states (California, New York, and Texas) are highlighted.

Figure 3: Imputed SNAP Benefits by State, 1997-2016



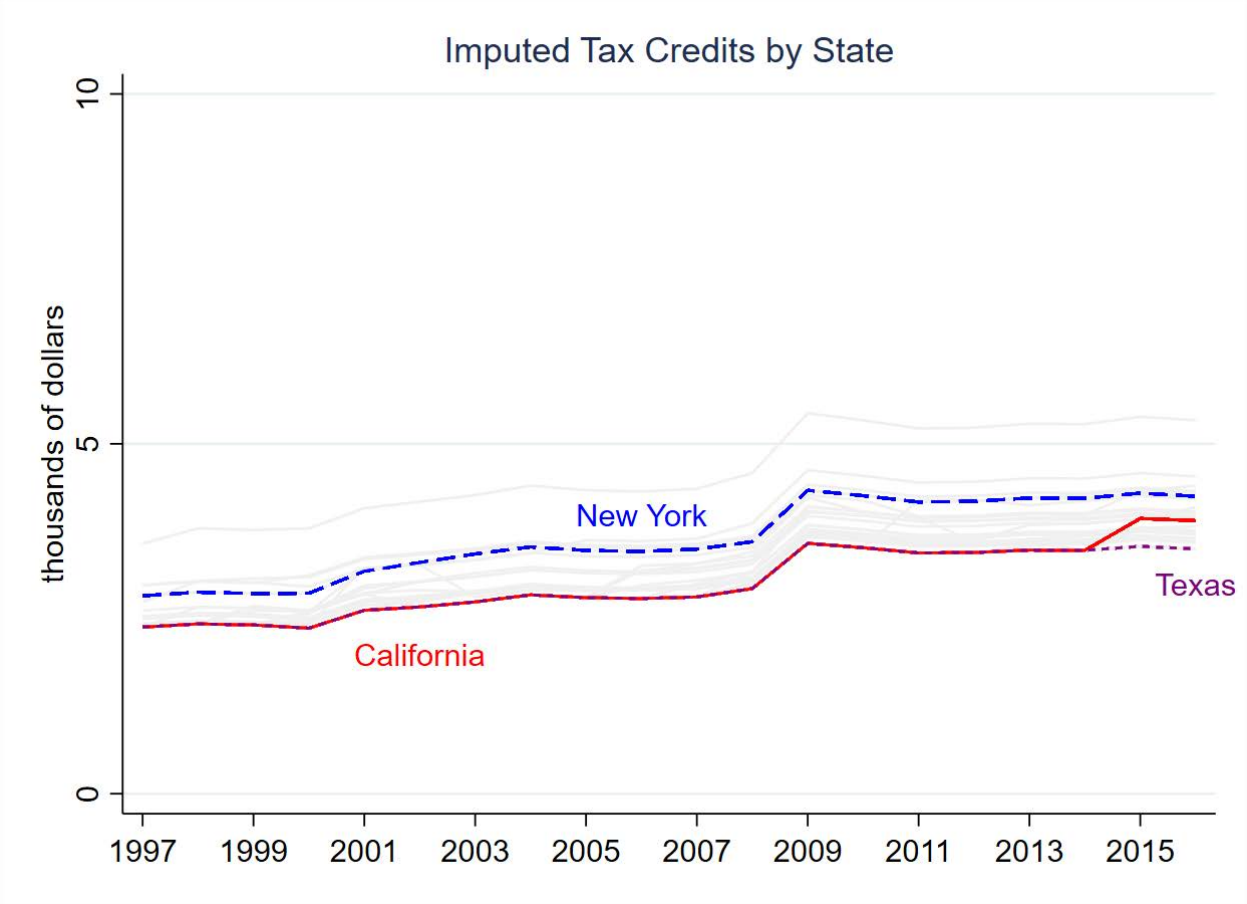
Notes: Figure illustrates average imputed SNAP benefits in thousands of dollars by state for a simulated sample of single parent families with 2 or more children where one is under the age of 6 and household head is a high school graduate. The three largest states (California, New York, and Texas) are highlighted. SNAP benefit levels are the same across the continental United States; state differences in imputed SNAP benefits stem primarily from differences in TANF generosity.

Figure 4: Imputed TANF Benefits by State, 1997-2016



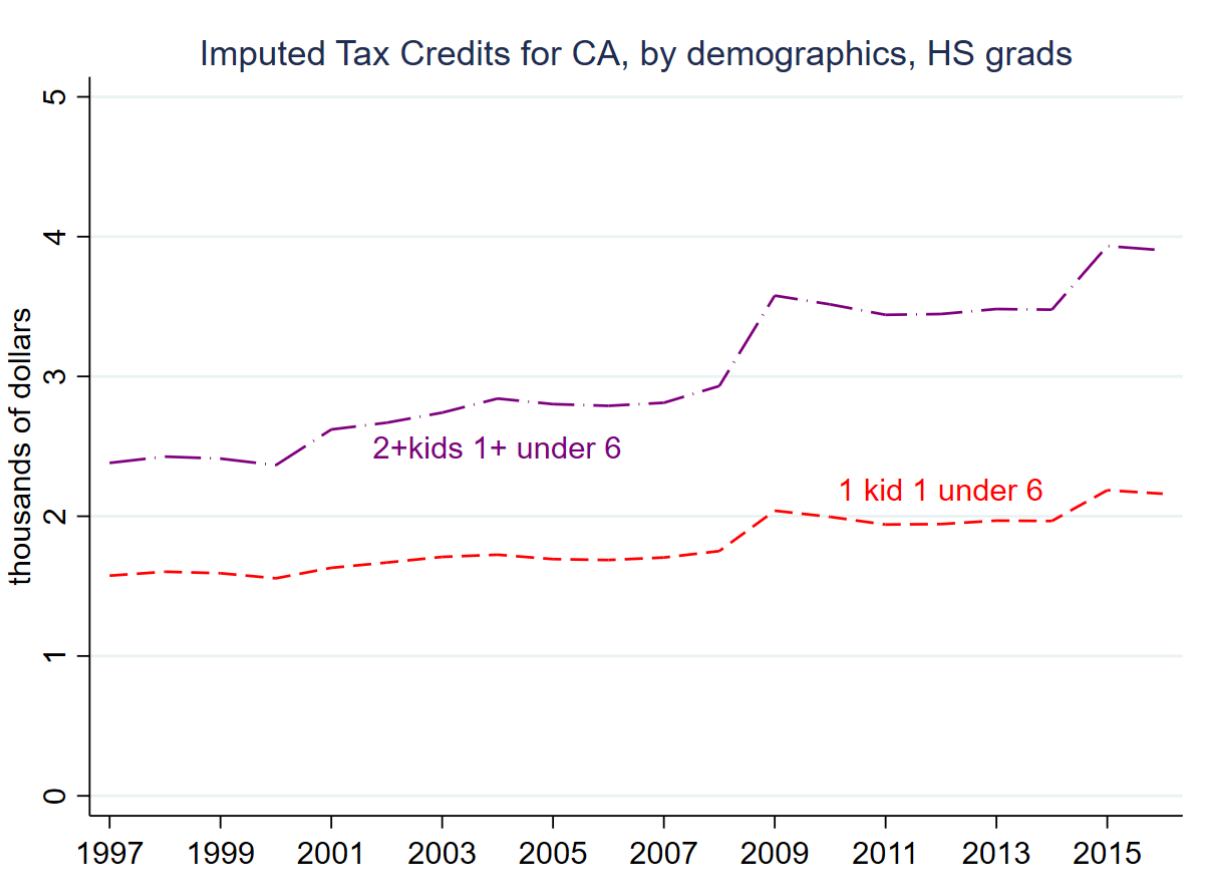
Notes: Figure illustrates average imputed TANF benefits in thousands of dollars by state for a simulated sample of single parent families with 2 or more children where one is under the age of 6 and household head is a high school graduate. The three largest states (California, New York, and Texas) are highlighted. Differences across states and over time stem from changes in state policy.

Figure 5: Imputed Tax Credits by State, 1997-2016



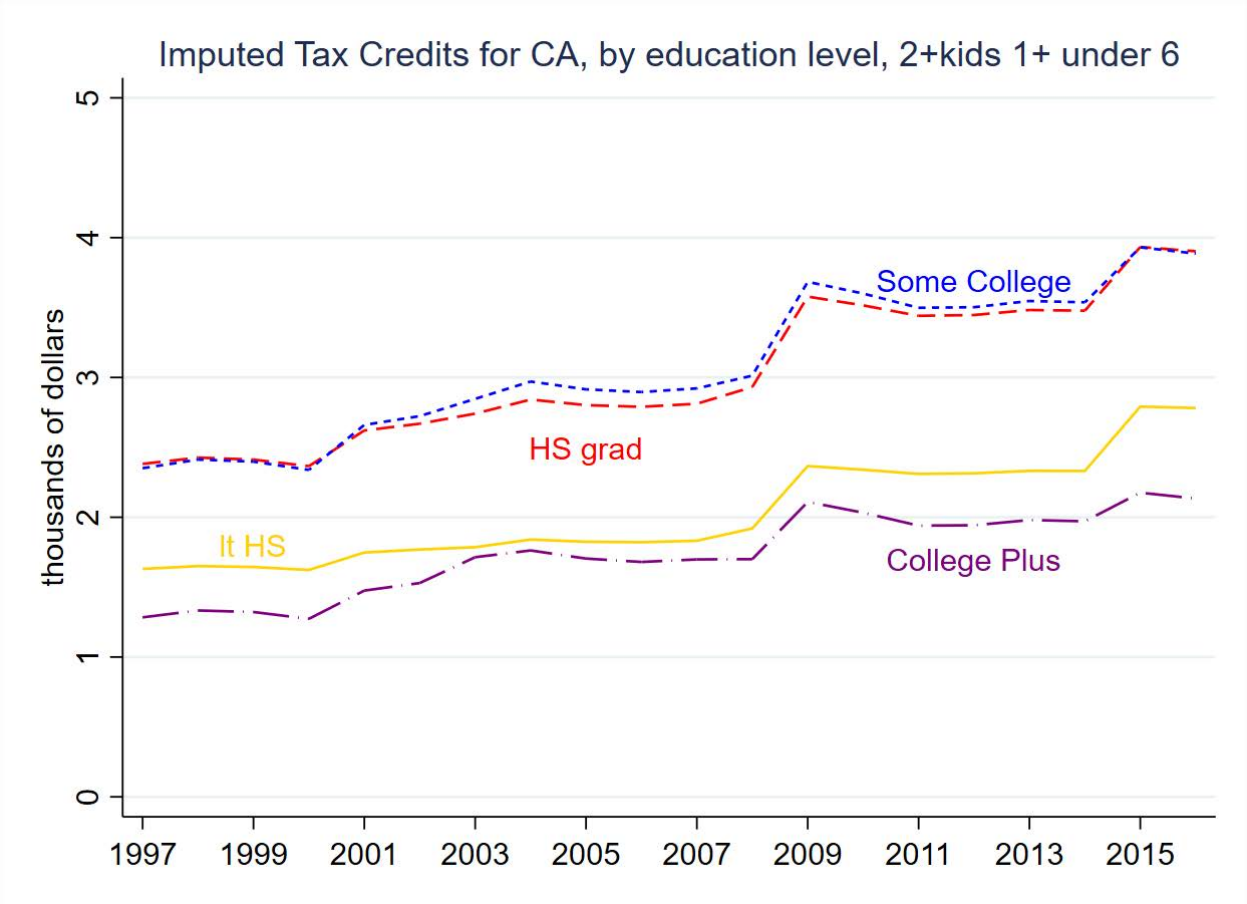
Notes: Figure illustrates average imputed tax credits by state in thousands of dollars for a simulated sample of single parent families with 2 or more children where at least one is under the age of 6 and household head is a high school graduate. The three largest states (California, New York, and Texas) are highlighted. Differences across states stem from differences in the state EITC; differences over time stem from changes in state and federal policy.

Figure 6: Imputed Tax Credits for California by Demographic Category



Notes: Figure illustrates average imputed tax credits in thousands of dollars by demographic category in the state of California for a simulated sample of single parent families with a high school degree and no college. The figure reflects families with at least one child under age 6.

Figure 7: Imputed Tax Credits for California by Education Level, 1997-2016



Notes: Figure illustrates average imputed tax credits in thousands of dollars by educational level in the state of California for a simulated sample of single parent families with 2 or more children where at least one is under the age of 6.

Table 1: Summary Statistics for NHIS Sample 1998-2016

	Mean (Standard Deviation)
Mother's age	30.61
	(12.83)
One child	0.538
Two or more children	0.462
Child less than 6	0.342
Nonhispanic White	0.593
Nonhispanic Black	0.240
Hispanic	0.132
Less than high school	0.176
High school (including GED)	0.313
Some college	0.401
BA or higher	0.176
Any welfare	0.344
TANF	0.038
SNAP	0.238
SSI	0.012
Medicaid	0.167
Severe psychological distress (SPD)	0.031
Moderate psychological distress (MPD)	0.186
Current daily smoker	0.223
Heavy drinker (among drinkers in the past year)	0.375
Observations	57302

Notes: Sample includes non-immigrant single mothers without disabilities from the NHIS Sample Adult Files from 1999-2016.

Table 2: Simulated Safety Net Generosity, Overall and by Year

Year	Cash and Food	Cash	SNAP	Tax Credits	TANF	Family Med elig
Overall	5.746	3.934	1.812	2.049	1.886	0.614
1998	5.641	3.951	1.690	1.691	2.260	0.425
1999	5.788	4.111	1.677	1.750	2.361	0.454
2000	5.721	4.063	1.658	1.723	2.340	0.550
2001	5.473	3.893	1.579	1.694	2.199	0.581
2002	5.555	3.990	1.566	1.855	2.135	0.617
2003	5.594	3.988	1.606	1.889	2.099	0.615
2004	5.660	4.027	1.633	1.945	2.082	0.611
2005	5.553	3.947	1.606	2.016	1.931	0.615
2006	5.654	3.902	1.752	1.981	1.921	0.627
2007	5.545	3.874	1.671	1.968	1.906	0.637
2008	5.303	3.710	1.594	1.967	1.743	0.635
2009	5.510	3.818	1.692	2.045	1.774	0.655
2010	6.223	4.228	1.995	2.445	1.783	0.671
2011	6.319	4.027	2.292	2.333	1.694	0.656
2012	6.163	3.908	2.255	2.313	1.595	0.659
2013	5.979	3.808	2.171	2.293	1.515	0.663
2014	5.959	3.845	2.114	2.334	1.511	0.667
2015	5.757	3.914	1.843	2.349	1.564	0.681
2016	5.459	3.664	1.795	2.293	1.372	0.670

Notes: All units are thousands of real 2016 dollars, with the exception of Medicaid eligibility, which is fraction of the family imputed to be eligible for Medicaid. Simulated safety net generosity is calculated by the following steps: 1) creating a simulated sample for each state and year by removing state and year identifiers from the 1997-2013 CPS-ASEC data and iteratively assigning the national sample for all years to each state in each year, 1997-2016; 2) running this simulated sample through the multi-program safety net calculator, using the policy rules for each state and each policy year 1998-2016; 3) calculating mean eligibility and mean benefit levels by 32 demographic cells, defined by disabled status, whether there was a child under the age of 6, whether there was more than one child, and education in four categories; 4) merging benefit generosity to the NHIS sample of nonimmigrant nondisabled single mothers by state-year-demographic cell.

Table 3: Effects of Safety Net Generosity on Self-Reported Welfare Participation

	Self-Reported Welfare Participation (mean = 0.344)
Panel A: Cash and Food Combined	
Simulated cash and food benefits (1000s)	0.0188**
	(0.004)
Simulated fraction of family Medicaid eligible	0.0748+
	(0.043)
Panel B: Cash vs Food	
Simulated cash benefits (1000s)	0.0142**
	(0.003)
Simulated SNAP benefits (1000s)	0.0483**
	(0.007)
Simulated fraction of family Medicaid eligible	0.1044*
	(0.043)
Panel C: Individual Programs	
Simulated tax credits (1000s)	0.0196**
	(0.007)
Simulated TANF benefits (1000s)	0.0134**
	(0.004)
Simulated SNAP benefits (1000s)	0.0480**
	(0.007)
Simulated fraction of family Medicaid eligible	0.0994*
	(0.043)
Observations	56,768

Notes: Dependent variable is an indicator for whether the family reported participation in any of the following welfare programs: TANF, SSI, SNAP, WIC, Medicaid, or CHIP. All simulated benefits are in thousands of real 2016 dollars. Standard errors clustered at the state level are in parentheses. +, *, and ** indicate statistical significance at the 10, 5, and 1 percent levels respectively. All regressions include controls for age of mother, number of children in household and presence of a child under 6, education, race, and interactions between race and all other individual level variables. They also include controls for individual-level urban residence, and state-level measures of the unemployment rate, UI dependent allowance, child support

dollars per capita, and public housing/voucher units per capita, as well as state and year fixed effects.

Table 4: Effects of Safety Net Generosity on Severe and Moderate Psychological Distress

	(1) SPD (mean=0.031)	(2) MPD (mean = 0.186)
Panel A: Cash and Food Combined		
Simulated cash and food benefits (1000s)	-0.0017+	0.0018
	(0.001)	(0.003)
Simulated fraction of family Medicaid eligible	0.0071	0.0231
	(0.017)	(0.041)
Panel B: Cash vs Food		
Simulated cash benefits (1000s)	-0.0019+	0.0019
	(0.001)	(0.003)
Simulated SNAP benefits (1000s)	-0.0001	0.0007
	(0.002)	(0.006)
Simulated fraction of family Medicaid eligible	0.0087	0.0221
	(0.017)	(0.042)
Panel C: Individual Programs		
Simulated tax credits (1000s)	-0.0070*	-0.0045
	(0.003)	(0.008)
Simulated TANF benefits (1000s)	-0.0012	-0.0012
	(0.001)	(0.001)
Simulated SNAP benefits (1000s)	0.0002	0.0011
	(0.002)	(0.006)
Simulated fraction of family Medicaid eligible	0.0134	0.0280
	(0.016)	(0.043)
Observations	56,768	56,768

Notes: See notes for Table 3. Dependent variable is an indicator for whether the mother had either severe or moderate psychological distress (from a Kessler-6 (K6) indicator of psychological distress over the past 30 days; SPD defined as K6>=13; MPD defined as 13>K6>=5).

Table 5: Effects of Safety Net Generosity on Currently Smoking Every Day and Heavy Drinking

	(1) Daily Smoking (mean = 0.223)	(2) Heavy Drinking (mean = 0.375)
Panel A. Cash and Food Combined		
Simulated cash and food benefits (1000s)	-0.0021	-0.006
	(0.003)	(0.005)
Simulated fraction of family Medicaid eligible	0.012	-0.0488
	(0.037)	(0.08)
Panel B: Cash vs Food		
Simulated cash benefits (1000s)	-0.0048+	-0.0099
	(0.003)	(0.006)
Simulated SNAP benefits (1000s)	0.0152*	0.0161
	(0.006)	(0.011)
Simulated fraction of family Medicaid eligible	0.0294	-0.0277
	(0.036)	(0.077)
Panel C: Individual Programs		
Simulated tax credits (1000s)	-0.0332**	-0.0215+
	(0.007)	(0.011)
Simulated TANF benefits (1000s)	-0.0007	-0.0083
	(0.003)	(0.006)
Simulated SNAP benefits (1000s)	0.0170**	0.0169
	(0.006)	(0.011)
Simulated fraction of family Medicaid eligible	0.0555	-0.0184
	(0.036)	(0.077)
Observations	56,553	33,013

Notes: See notes for Table 3. Dependent variable in Column 1 is an indicator for whether the mother answered "every day" to the question "Do you now smoke cigarettes every day, some days, or not at all?". Dependent variable in Column 2 is is an indicator for whether the mother reported heavy drinking, defined as drinking 4 or more drinks in one day in the past year. This question is only asked of those who ever drank during the year.

Table 6: Effects of Safety Net Generosity on Severe and Moderate Psychological Distress, by half year

	(1) SPD Q1&Q2 (mean=0.039)	(2) SPD Q3&Q4 (mean=0.039)	(3) MPD Q1&Q2 (mean=0.197)	(4) MPD Q3&Q4 (mean=0.192)
Panel A: Cash and food combined				
Simulated cash and food benefits (1000s)	-0.0024	-0.0008	-0.0016	0.0047
	(0.002)	(0.001)	(0.003)	(0.004)
Panel B: Cash v food				
Simulated cash benefits (1000s)	-0.0028	-0.0009	-0.0014	0.0049
	(0.002)	(0.001)	(0.003)	(0.005)
Simulated SNAP benefits (1000s)	0.0000	-0.0001	-0.0031	0.0035
	(0.004)	(0.003)	(0.009)	(0.009)
Panel C: Individual Programs				
Simulated tax credits (1000s)	-0.0140**	0.0010	-0.0186*	0.0095
	(0.004)	(0.005)	(0.009)	(0.011)
Simulated TANF benefits (1000s)	-0.0012	-0.0011	0.0011	0.0042
	(0.002)	(0.001)	(0.003)	(0.004)
Simulated SNAP benefits (1000s)	0.0008	-0.0002	-0.0019	0.0033
	(0.004)	(0.004)	(0.008)	(0.009)
Observations	27,966	28,802	27,966	28,802

Notes: See notes for Table 4. Regressions also control for the simulated fraction of the family that is Medicaid-eligible.

Table 7: Effects of Safety Net Generosity on Smoking and Drinking, by half year

	(1) Smoking Q1&Q2 (mean=0.229)	(2) Smoking Q3&Q4 (mean=0.229)	(3) Drinking Q1&Q2 (mean=0.375)	(4) Drinking Q3&Q4 (mean=0.369)
Panel A: Cash and food combined				
Simulated cash and food benefits (1000s)	-0.0062*	0.0023	-0.0147*	0.0012
	(0.003)	(0.004)	(0.007)	(0.008)
Panel B: Cash v food				
Simulated cash benefits (1000s)	-0.0089**	-0.0004	-0.0165*	-0.0050
	(0.003)	(0.004)	(0.008)	(0.008)
Simulated SNAP benefits (1000s)	0.0113	0.0193+	-0.0045	0.0353*
	(0.007)	(0.010)	(0.013)	(0.016)
Panel C: Individual Programs				
Simulated tax credits (1000s)	-0.0494**	-0.0160	-0.0208	-0.0213
	(0.009)	(0.010)	(0.014)	(0.014)
Simulated TANF benefits (1000s)	-0.0032	0.0019	-0.0158+	-0.0028
	(0.004)	(0.004)	(0.008)	(0.008)
Simulated SNAP benefits (1000s)	0.0141*	0.0202+	-0.0042	0.0365*
	(0.007)	(0.010)	(0.013)	(0.016)
Observations	27,865	28,688	16,268	16,745

Notes: See notes for Table 5. Regressions also control for the simulated fraction of the family that is Medicaid-eligible.

Appendix Tables

Appendix Table 1: Effects of Safety Net Generosity on Participation in Individual Programs

	(1) TANF	(2) SNAP	(3) Medicaid
Panel A: Cash and Food Combined			
Simulated cash and food benefits (1000s)	0.0151**	0.0219**	0.0242**
	(0.002)	(0.004)	(0.005)
Simulated fraction of family Medicaid eligible	0.0464*	-0.0525	0.0877+
	(0.021)	(0.041)	(0.045)
Panel B: Cash vs Food			
Simulated cash benefits (1000s)	0.0179**	0.0144**	0.0236**
	(0.002)	(0.003)	(0.006)
Simulated SNAP benefits (1000s)	-0.0023	0.0703**	0.0280**
	(0.003)	(0.006)	(0.006)
Simulated fraction of family Medicaid eligible	0.0288	-0.004	0.0915+
	(0.021)	(0.033)	(0.046)
Panel C: Individual Programs			
Simulated tax credits (1000s)	-0.0082*	0.0081	0.0232**
	(0.004)	(0.007)	(0.009)
Simulated TANF benefits (1000s)	0.0216**	0.0153**	0.0236**
	(0.002)	(0.003)	(0.006)
Simulated SNAP benefits (1000s)	-0.0007	0.0707**	0.0280**
	(0.003)	(0.007)	(0.006)
Simulated fraction of family Medicaid eligible	0.0526*	0.0017	0.0918*
	(0.022)	(0.033)	(0.042)
Observations	56,577	56,592	56,421

Notes: See notes for Table 3. Dependent variable is an indicator for self-reported participation in the program listed. Standard errors clustered at the state level are in parentheses.

Appendix Table 2: Summary Statistics for NHIS Sample 1998-2016, by half year

	Mean (Standard Deviation)	Mean (Standard Deviation)
	Q1&Q2	Q3&Q4
Mother's age	31.13	31.13
	(13.19)	(13.25)
One child	0.535	0.538
Two or more children	0.465	0.462
Child less than 6	0.336	0.342
Nonhispanic White	0.591	0.594
Nonhispanic Black	0.244	0.241
Hispanic	0.132	0.129
Less than high school	0.199	0.168
High school (including GED)	0.303	0.327
Some college	0.390	0.397
BA or higher	0.104	0.103
Any welfare	0.366	0.362
TANF	0.044	0.039
SNAP	0.259	0.246
SSI	0.026	0.025
Medicaid	0.182	0.187
Severe psychological distress (SPD)	0.039	0.039
Moderate psychological distress (MPD)	0.197	0.192
Current daily smoker	0.229	0.229
Heavy drinker (among drinkers in past year)	0.375	0.369
Observations	29958	30873

Notes: Sample includes non-immigrant single mothers without disabilities from the NHIS Sample Adult Files from 1999-2016.