# The Effect of Safety Net Programs on Food Insecurity[⊗]

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Abstract: We investigate to what extent major safety net program benefits affect food insecurity in families. We impute program eligibility and benefits in each state for 2001-2009, accounting for cross-program eligibility rules. We use simulated eligibility and benefits for a nationally representative sample as instruments for imputed eligibility and potential benefits. Among non-immigrant, low-income single-parent families, $1000 in potential cash or food benefits reduces the incidence of food insecurity by 1.1 percentage points on a base of 33 percent. Cash and food both reduce food insecurity. The results highlight the importance of jointly considering a full range of safety net programs.

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## I. Introduction

In 2012, almost 20 percent of US households with children were defined as food insecure by the U.S. Department of Agriculture (USDA), meaning that they did not consistently have access to sufficient quantity or quality of food for a healthy and active lifestyle. This suggests that tens of millions of Americans face challenges when it comes to meeting their basic food needs. These challenges range from worrying that food would run out (experienced by 95 percent of the food insecure) to being hungry but not eating (31 percent of the food insecure).[1] Food insecurity is associated with a wide range of negative health and economic outcomes, making its reduction a key policy priority. Food insecurity also serves as an indicator of material hardship more broadly, so it can serve as a proxy for economic well-being in cases where other measures such as consumption are not readily available.[2]

Reductions in food insecurity are a primary goal of public nutrition programs, and substantial research has investigated the effect of these programs on food insecurity among families and children. However, less is known about how *non-food* safety net programs affect food insecurity. Safety net programs may allow at-risk families to avoid or reduce food insecurity, but program effects may depend on their mix of cash- and non-cash benefits and the degree to which they crowd out food-specific transfers. In addition, the safety net includes a number of different programs that interact with each other in important ways. Given that many families simultaneously receive benefits from multiple programs, it is important to look at the effectiveness of the safety net in aggregate rather than relying on separate examinations of the effects of each individual program.

In this paper we investigate how the level of benefits received from the safety net as a whole and the distribution of benefits among cash, food, and health insurance affect food insecurity. We focus on single-parent families with incomes below 300 percent of the poverty

line, as these families are both more likely to suffer material hardship and are key intended beneficiaries of safety net programs. We consider means-tested programs in three categories: cash assistance, food assistance, and public health insurance. Temporary Assistance to Needy Families (TANF, formerly Aid to Families with Dependent Children or AFDC) offers cash welfare for low-income families, Supplemental Security Income (SSI) provides cash benefits for the disabled, and the federal and state Earned Income Tax Credits (EITC) provide subsidies to working families through the Federal and state tax codes. We examine food assistance in the form of the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program), the National School Lunch Program (NSLP) which provides free or subsidized lunch in school, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) which provides food packages to pregnant and post-partum women and young children. Finally, we consider public health insurance: Medicaid and the Children's Health Insurance Program (CHIP).

Using data from the Current Population Survey Food Security Supplement, we examine how reported food insecurity responds to benefits from these programs. To determine the level of benefits for which a family would be eligible, we use the reported rules in effect for each program in each state in each year. Since benefits are likely to be endogenous—families eligible for higher benefits are also more likely to be food insecure for reasons that may be unobservable—we use the average program generosity by state, year, and demographic cell simulated for a national sample of families as an instrument for imputed benefits. Identification thus comes from variation within states over time and across family composition in the level of benefits available.

The results suggest that the safety net does impact food insecurity. Each $1000 in combined annual cash and food benefits for which a low-income single-parent family is eligible reduces food insecurity by 1.1 percentage points on a base rate of 33 percent. When cash and food assistance are examined separately, we find that either form of assistance has the potential to reduce food insecurity among vulnerable families.

## II. Background and Motivation

A household is considered food secure if all members have access at all times to a sufficient quantity, quality and variety of food for an active, healthy life (Nord, Andrews, and Carlson 2009). Food insecurity emerges when households face limitations in access to food. Official food insecurity statistics come from a Food Security Supplement in the December Current Population Survey (CPS), in which 18 questions are asked about whether households are able to meet basic food needs. Households that report three or more food insecure conditions are classified as food insecure. Food insecure households are further divided into those having *low food security* and *very low food security*, where very low food security households with children report eight or more food insecure conditions. Many food insecure families are able to avoid reductions in food intake by reducing the quality and variety of their diets. However, even among the less severely affected low food security households, 38 percent reported eating less than they think they should, roughly 20 percent reported cutting or skipping meals in three or more months out of the year, and almost 10 percent reported that they were hungry but did not eat (Coleman-Jensen, Gregory, and Singh 2014). Despite considerable debate on the interpretation of food insecurity measures (see the National Research Council 2006 for a summary of these issues), the food insecure population faces a number of serious challenges in

meeting their basic food needs. In this paper, we examine food insecurity, which includes both low food security and very low food security households.

Over the period 2001-2009, 17 percent of non-immigrant families with children experienced food insecurity in an average year. Single-parent families under 300 percent of the poverty line are roughly twice as likely to experience food insecurity (33 percent). Food insecurity is associated with negative nutritional outcomes for adults (Bhattacharya, Currie, and Haider 2004) and a wide range of adverse health outcomes for adults and children (see Gundersen and Kreider 2009 and Gundersen, Kreider, and Pepper 2011, for reviews).[3] The issue of food insecurity has received heightened attention recently because it increased in 2008 with the Great Recession and has remained elevated through 2013 (Coleman-Jensen, Gregory, and Singh 2014).

A large literature examines the impact of nutrition programs on food insecurity. SNAP recipients have rates of food insecurity that are twice as large as those of eligible non-recipients (Gundersen, Kreider, and Pepper 2011). These paradoxical results can be largely attributed to self-selection of vulnerable households into food assistance programs. In addition, there is significant underreporting and measurement error of program participation in commonly used survey data (Meyer, Mok, and Sullivan 2009). A number of papers that have accounted for selection bias and/or measurement error find beneficial effects of food assistance programs on food insecurity. These include Gundersen and Oliveira (2001); Gundersen and Kreider (2008); Nord and Golla (2009); Ratcliffe, McKernan, and Zhang (2011); Mykerezi and Mills (2010); Nord and Prell (2011); and Kreider et al. (2012).

Comparatively little research, however, has addressed the effect of *non-food* safety net programs on food security. Cash or in-kind programs like public health insurance expand the

total resources available to the household and provide a buffer against income shocks. To the extent that these additional resources are used for food, they may reduce food insecurity. Borjas (2004) reports that cash welfare generosity decreases food insecurity among immigrants, for instance.

In addition, analyses of food assistance failing to account for the generosity of other safety net programs may yield biased estimates of the marginal impact of food benefits. Safety net recipients tend to participate in multiple programs. This is readily evident in Table 1, which shows participation rates for a March CPS sample of low-income single-parent families.

Furthermore, the effect of non-food programs and nutrition programs may depend on how they interact with each other. For example, households that are fully enrolled in TANF or SSI may be categorically eligible for nutrition assistance programs (see Brauner and Zedlewski 1999). On the other hand, by increasing family income, cash assistance generosity may reduce benefit levels for food assistance programs (see Ziliak, Gundersen, and Figlio 2003). Duggan and Kearney (2007) reports that households receive fewer nutrition benefits following enrollment in the Supplemental Security Income program, for instance. Our calculations suggest that 15-20 cents of SNAP benefits are lost for each dollar of cash welfare eligibility. The shift from food to cash benefits induced by cash program generosity may change resource allocation in the household and crowd out food spending.

Theoretically, the net result of the “income effect” associated with non-food program benefits (resulting from expanded resources) and the “substitution effect” (stemming from fewer constraints to allocate household resources to food) is ambiguous and requires empirical investigation. Understanding how household food consumption is affected by the type of safety net support (cash, food, or health insurance) is critical for the effective design of poverty policy.

Even if cash and non-cash programs have similar effects, it is useful to evaluate the impact of the overall safety net package.

## III. Methodology and Data

Because the goal of this analysis is to examine how the safety net affects food insecurity, the general empirical approach is to regress food insecurity on measures of safety net generosity. We account for selection bias with a simulated eligibility instrumental variables approach described below.

### A. Food Security and Program Calculators

Our food security data come from the 2001-2009 Current Population Survey Food Security Supplement (CPS FSS), which is conducted in December of each year. Respondents are asked about household food spending and whether the household is able to meet its food needs. Based on their answers to eighteen FSS questions covering the experience of the prior 12 months, households are classified as food secure or having food insecurity according to a scale developed by the U.S. Department of Agriculture. Our outcome of interest is food insecurity, which includes households classified as having low food security or very low food security. Because the FSS occurs in December, the 12-month food security scale roughly corresponds to the calendar year.

The unit of observation for the analysis is the family.[4] Families are included in the sample if the reference person is between ages 18 and 64, is unmarried, and has at least one never-married child under 18 living in the household. Families are excluded if earnings information is incomplete (see more detail below), if they did not complete the food security supplement, or if any member of the family is an immigrant.[5] We restrict the sample to families

under 300 percent of the poverty level because this range captures most variation in safety net eligibility and to single-parent families because food insecurity rates are higher for this group.[6]

Table 2 describes the summary statistics for the sample. Among this group, which is more economically disadvantaged and more food insecure than the general population, 33 percent report food insecurity. Nine percent of sample families have a disabled member ages 15 and up,[7] about half have two or more children, and fewer than half have any college education. About two thirds of parents are employed.[8]

Benefit receipt information is not available in the December CPS. Instead, we impute program eligibility for each family and base our analysis on the imputed potential benefits a family could receive, rather than the actual receipt of benefits.[9] Potential benefits are of independent interest to policy-makers because they are the primary levers by which actual benefits are influenced.

Though income is necessary to impute program eligibility, the December CPS lacks data that distinguishes between earned and unearned income. To address this issue, we use the data on earnings that are collected when a household is in the outgoing rotation groups (ORG) of the CPS (the households in months four or eight of the data collection). We match each member of a December CPS FSS family over the age of 15 to earnings data from the appropriate month. For a quarter of the sample, the outgoing rotation group questions are asked in December, while the other three quarters of the sample are matched to data from January, February, or March. We do the matching on the basis of identifiers available in the CPS data, and we check the quality of matches using reported information in both months on sex, age, and race.

Use of the earnings data presents several challenges. First, a fraction of the sample cannot be matched because of identifier error, because a family moves, or because an individual exits

the family**.** Furthermore, a successful match may yield incomplete earnings information, most often because an individual is self-employed. Overall, about 87 percent of single-parent families successfully match with complete earnings information for the respondent.[10] Families in which adults do not match are excluded from the sample.

A second issue is that ORG earnings are reported as weekly earnings and have more variance than annual or monthly earnings used in benefit determination. Thus, there is error in the eligibility imputation.[11] Finally, unearned income is unavailable in the ORG data, so we assume unearned income is zero except for transfer income imputed by our calculators.[12] Since assets are not observable in the CPS, we ignore asset tests in eligibility determination, as is common in the literature.

We use the FSS matched to ORG data to impute eligibility and potential benefit amounts for the safety net package for each family. The definition of a "family" for benefits determination varies by program and our calculators account for this fact. Generating estimated program benefits requires care because benefits from one program can affect benefits from another. In order to model the interactions between programs correctly, we use a sequential process.

First, the matched FSS-ORG data are run through the TAXSIM program available through the National Bureau of Economic Research to calculate federal and state EITCs. Inputs to the EITC calculators include marital status, number of children, ages of children, earnings of respondent, and state and year of residence. Thus, for each family, we have a measure of the EITC potentially received from its state and Federal taxes given its imputed annual earnings.

The output from TAXSIM is run through the SSI calculator, which calculates SSI benefits. Some states supplement federal SSI benefits, generating variation across states and over time. We use CPS self-reports of activity-limiting disabilities for members of the household

ages 15 and up. Self-reported disability measures can lead to error in eligibility imputation for SSI (Burkhauser, Houtenville, and Tennant 2014). In addition, family potential SSI benefits will be understated to the extent that there are child SSI recipients in the household.

We use the output of the SSI calculator for the TANF calculator, assuming that individuals fully utilize available SSI benefits since SSI benefits are more generous than the comparable TANF benefits. Individuals who receive SSI are ineligible for TANF, but other family members may be eligible for TANF using a family definition that excludes the individual receiving SSI. For TANF eligibility determination, we use rules in each state applying to new cases. For benefit determination, we use rules applying to individuals with 11 months of prior benefit receipt.

The Medicaid/CHIP calculator follows, as SSI and TANF receipt affect eligibility for Medicaid. We impute eligibility for each individual in the family and then calculate the fraction of the family that is eligible for public health insurance. We do not monetize the value of health insurance due to the considerable uncertainty in how families value it (see Smeeding and Moon 1980) and throughout our analysis we treat Medicaid/CHIP eligibility separately from the other safety net programs.

Finally, we put families through the food assistance calculator, where eligibility and benefits are affected by both SSI and TANF. We monetize the value of school lunch to be the reimbursement rate in that state and year times the number of school days times the number of school-aged children. We monetize the value of WIC based on average food cost per recipient times the number of children of eligible age. We monetize SNAP benefits on a dollar-for-dollar basis, which improves on previous literature by allowing us to consider a continuous rather than dichotomous measure of SNAP benefits.

At the end of this process we have imputed potential benefits for the programs; we refer to them as *imputed real potential* benefits because they are calculated assuming full take-up of all programs and adjusted for inflation. Additional details about the assumptions underlying the programming of the calculators are provided in the online appendix.[13] Almost 90 percent of the families in the sample are imputed to be eligible for cash or food benefits, with the EITC and food assistance reaching the most families. The average annual potential combined cash and food package is imputed to be about $5700 (in 2005 dollars).

Panel A of Table 3 reports summary statistics and annual means for imputed real potential benefit levels for the sample. The average family in the single-parent, low-income sample was imputed to be eligible for $2,017 in TANF benefits, $615 in SSI benefits, $1,324 in EITC benefits, and $1,755 in food assistance. The combined cash and food package increased by 22 percent between 2001 and 2009, from $5,396 to $6,591. A majority of this increase stemmed from higher levels of food assistance. To check for errors arising from our use of matched ORG weekly earnings, we repeat the exercise with the March CPS and find comparable imputed potential benefit levels (not shown).

We also examine reported benefit receipt in the March CPS. As shown in panel B of Table 3, reported benefit amounts are lower than imputed potential benefit amounts, reflecting some combination of incomplete take-up, under-reporting, and measurement error in the imputation. Reported TANF benefits are low and declining relative to imputed potential benefits, likely reflecting a welfare office emphasis on “diversion” from cash assistance among those who are eligible. For food assistance, both imputed potential benefits and reported benefits received increased substantially over the sample period. Overall, including an imputed $1492 in EITC

benefits, the average single-parent family under 300 percent of poverty receives $3473, or about 60 percent of the imputed potential benefits.

**B. Estimation Strategy**

If potential benefit levels were determined exogenously for each household, we would be interested in estimating linear probability models of the form:

$$FI_{icst} = \beta_0 + \beta_1 benefit_{icst} + X_{icst}\alpha + \theta_s + \lambda_t + u_{icst} \quad (1)$$

where *FI* is an indicator for food insecurity in family *i* in demographic cell *c* in state *s* in year *t*, *benefit* is the level of potential benefits for the various safety net programs the family is imputed to receive, *X* represents a vector of state and individual level controls, θ represents state fixed effects, and λ represents year fixed effects. We include the state unemployment rate in our base specification and add additional time-varying policy controls in other specifications.[14] Demographic controls include whether the family includes a child under age six, whether the family has one, two, three, or four or more children, respondent age, and a three-way interaction between education in three categories, race in four categories, and disability status. Thus, the model controls for observable characteristics of families living in states in a given year, all characteristics of states that are fixed over the study period, time-varying economic conditions, and year-to-year national variation in food insecurity. We do not control for employment or earnings in the base specification because they may be endogenous to program generosity. The key coefficient $\beta_1$ represents the effect of benefit generosity on the prevalence of food insecurity.

An important challenge with estimating equation (1) is endogeneity of potential benefits. For example, a state with a fixed set of program rules will have higher rates of program eligibility in bad times compared to good, and is also likely to have more food insecurity because of the bad economic conditions. We thus use the average program generosity by state, year, and

demographic cell simulated for a national sample of families as an instrument for imputed potential benefits. This simulated benefits approach is in the spirit of that used by Currie and Gruber (1996). The simulation approach is a way of summarizing complicated program rules into a meaningful set of statistics. Simulated generosity is correlated with benefit levels only because of policy rules and formulas, not because of economic conditions of individual families.[15] A rich state with generous policy parameters might have a high *simulated* eligibility rate because a large portion of a national sample would qualify, but a low *imputed* eligibility rate for a program because few of its residents are poor enough to qualify for a program. Because we control for state fixed effects and year fixed effects, we rely on within-state differences in the policy parameters across demographic groups and over time to identify the effects of program participation on food insecurity.

To obtain this exogenous measure of program generosity, we take the national CPS sample, strip state and year identifiers from the data, and replicate it for each state and the District of Columbia for years 2001-2009. Running these data through our series of benefit calculators gives a measure of state-level differences in program generosity while abstracting from state-level differences in population characteristics and economic environment. We focus on program generosity for non-immigrant, single parent families under 300 percent of the poverty line.[16]

After running these simulated data through the benefit calculators, we average the predicted benefit amounts for the simulated data by cell to create the instruments. The instruments are cell means of simulated potential benefits, where the cells are defined by state, year, disability status (any disabled person aged 15+ in family), any child under age six in the

family, number of children (one or multiple), and highest education of parent (less than high school, high school, or more than high school).[17]

Simulated benefit levels for the fixed 2001 sample are shown in panel C of Table 3. These numbers represent the changes in benefit generosity arising solely from policy parameter changes, and exclude the portion of the benefit change that arises from changing economic circumstances of families. The total cash and food package for the fixed sample increases by only 7 percent between 2001 and 2009 for the fixed sample, suggesting that much of the observed 22 percent rise in potential benefits (in panel A) stemmed from adverse economic changes rather than changes in policy parameters. There was a 34 percent expansion in real food assistance generosity between 2001 and 2009, which offset declining TANF generosity. The difference between panel A, which reflects economic, demographic, and policy changes, and panel C, which considers policy changes alone, highlights the importance of using an instrumental variables strategy to examine the effect of the safety net on food insecurity. Our analysis also reveals substantial variation in simulated benefits within states over time. For example, the real value of simulated cash and food benefits rose by $604 in Virginia and just $38 in California over the 2001-2009 period.

The instrumental variables strategy uses simulated benefit levels as instruments for imputed potential benefits. Although the instrumental variables approach purges the estimates of many potential confounders, bias will arise if policies respond directly to food insecurity or its correlates. We cannot rule out this bias, but we do examine the association between the safety net and family economic conditions such as employment and earnings to gauge the extent to which this might be a problem.

Finally, we explore the importance of considering the interactions of program eligibility and benefits across programs. To do so, we calculate "naïve" versions of TANF, food assistance and Medicaid benefits, where the benefits for each program are calculated ignoring the potential benefits from the other programs. For example, the naïve potential benefits for SNAP are calculated without regard to TANF or SSI income and are therefore higher than the true potential benefits. The means of the naïve versions of cash and food variables are reported in panel D of Table 3. The naïve imputed benefit levels for all cash and food programs combined average over $400 higher than in the top panel. This is mainly due to the much higher level of imputed food assistance when one ignores TANF and SSI income.

## IV. Results and Discussion

### A. Main Results

Table 4 presents results from the first stage of the two-stage least squares regressions. We examine the instruments for cash and food benefits combined, cash and food separately, and each safety net program separately. In all cases, simulated potential benefit levels using the fixed national sample are strongly and positively related to imputed potential benefit levels. Furthermore, in all cases the instruments are jointly significant with F-statistics above 20.[18] We conclude that the first stage is sufficiently strong for a second-stage analysis. As shown in Schmidt, Shore-Sheppard, and Watson (2013), these instruments also predict reported actual benefit receipt in the March CPS.

Table 5 presents the main results. For reference, column I shows results from an OLS regression examining the relationship between food insecurity and combined potential cash and food benefits and family Medicaid eligibility. The OLS results demonstrate that the level of

potential benefits for safety net programs is *positively* associated with food insecurity for low-income single-parent families. This result is unsurprising, since disadvantaged families are both more likely to qualify for social safety net programs and more likely to be food insecure. Column II adds state level policy controls and controls for family employment and income category; these controls attenuate but do not eliminate the positive OLS coefficient.

To address the selection problem and isolate the causal impact of program generosity on food insecurity, we turn to the instrumental variables strategy described above. The IV strategy purges the estimates of bias stemming from the fact that a family's economic circumstances are correlated both with program eligibility and food insecurity. The key finding, shown in column III of Table 5, is that the safety net does matter. Raising a family's combined potential cash and food package by $1000 reduces food insecurity by 1.1 percentage points, on a base of 33 percent. Moving from the 10$^{th}$ percentile state (Kentucky, with a mean potential benefit package of $4,567 for the simulated sample) to the 90$^{th}$ percentile state (Vermont, with a package of $6,901 for the simulated sample) would increase potential benefits within the analysis sample by about $1,688 and reduce food insecurity by 1.8 percentage points.[19] Moving from the 10$^{th}$ percentile ($0) annual family potential benefit to the 90$^{th}$ percentile ($12,569) family benefit would decrease food insecurity by 13.8 percentage points; this decline corresponds to 40 percent of the overall rate of food insecurity in the sample.[20]

Another way to gauge the magnitude of the coefficient is to consider the expansion of the safety net during the Great Recession. Between 2007 and 2009, the average annual combined cash and food package increased by $555 in the fixed simulated sample. Almost all of this increase was associated with expansions in the SNAP and EITC programs.[21] At the same time, food insecurity rose over the period by 6.9 percentage points in the actual sample, from 29.0 to

35.9. The estimates suggest that without the safety net expansion, the 2009 rate of food insecurity would have been 0.4 percentage points higher.

Column IV of Table 5 adds state-year policy parameters to the model as well as (potentially endogenous) family level economic controls for employment and poverty status. The coefficients on the effect of the cash and food benefit package are not substantively changed. Our preferred specification is the parsimonious specification in column III because it offers the most statistical power and avoids over-controlling for labor market responses that may be endogenously induced by the programs.

Throughout the analysis, the Medicaid coefficient is positive, though usually statistically insignificant. As discussed below, part of the positive relationship between Medicaid and food insecurity appears to be driven by a substantial negative association between earned income and Medicaid generosity. This could reflect a causal impact of Medicaid on labor market attachment, or could reflect policy endogeneity in the timing of Medicaid expansions. We lack confidence in the Medicaid results, and leave further investigation of the impacts of the Medicaid program to future research.

Columns V and VI of Table 5 investigate the separate effects of cash and food assistance. The estimated benefit of food programs is about 15 percent larger than the estimated benefit of cash programs, but the standard errors are large and the coefficients are not statistically different from one another. This finding is consistent with evidence from Hoynes and Schanzenbach (2009) that food stamps are treated like cash by recipients, but the lack of statistical difference between cash and food here could simply reflect a lack of statistical power. Similarly, in columns VII and VIII, point estimates on each of the cash and food programs are negative when they are allowed to enter separately, but they are statistically indistinguishable from zero and each other.

**B. Robustness Checks**

We perform a number of additional analyses in Table 6. First, we consider two alternative forms of the instruments. The first, corresponding to the results in column II, relies solely on state-year variation in safety net generosity for single parents under 300 percent of the poverty line. The estimated effect of the safety net using this approach is larger than our baseline estimate, but has large standard errors. The second (column III) relies on variation by state, year, and disability status. The coefficient is closer to our baseline estimate, but again larger in magnitude. Due to the more limited variation using these alternative instrument sets, we have more confidence in our more conservative baseline results.

In columns IV and V we look for evidence of policy endogeneity by examining whether the safety net predicts family-level economic outcomes. There is no evidence that the generosity of the cash and food safety net affects the probability of employment of the respondent or affects earned income. On the other hand, we do find evidence that Medicaid generosity is associated with lower rates of earned income and large (but statistically insignificant) reductions in employment. The magnitudes of the coefficients raise the concern that the Medicaid program expands in response to negative economic conditions, so although we find no evidence of policy endogeneity for cash and food programs, we are less confident that the Medicaid instrument satisfies the exclusion restriction.[22]

**C. Which Aspects of Food Insecurity Are Affected by Safety Net Generosity?**

Our results thus far indicate that food insecurity broadly defined is reduced when the safety net is more generous. However, food insecurity encompasses a variety of aspects, including measures of insufficient resources to buy food and anxiety about not having enough food. We thus investigate which aspects of food insecurity are affected by the safety net. In

addition, we examine the relationship between the safety net and the extreme outcome of very low food security.

The results are shown in Table 7. Each cell reflects the coefficient on cash and food from a separate 2SLS regression with a different outcome variable. The key coefficient from column III of Table 5 is replicated in the first row. In the second row we show the coefficient from the regression using very low food security as the outcome; very low food security affects about 10 percent of the sample. The coefficient on very low food security is also negative, but it is not statistically significant. We then investigate nine measures of food hardship, including six of the questions that are used as inputs into the measure of food insecurity. All of the coefficients are negative, and five of the nine are statistically distinguishable from zero. The safety net appears to reduce the probability that respondents need more money to meet their food needs, that they ran short of food money over the past 12 months, or that they sometimes or often did not have enough food to eat in the household over the past 12 months. It also appears to reduce the probability that respondents ate less than they felt they should or were hungry but did not eat because of insufficient money for food. The results suggest that the safety net affects the reported adequacy of food consumption and not just financial anxiety.

**D. Marginal Effects and Naïve Estimators**

The analysis thus far investigates the effect of cash benefit generosity holding food benefits constant. From the point of view of the state policy-maker, however, this may not be the parameter of interest, because federal food assistance changes mechanically when states offer more generous cash benefits. TANF and SSI benefits are typically insufficient to make a family ineligible for food assistance, so the main effect arises through a reduction in the dollar value of SNAP benefits among the eligible. This effect can be seen in Figure 1, which uses 2001 state

policies to simulate the average benefits potentially received in a 2001 CPS sample nationally representative of single-parent, non-immigrant families under 300 percent of the poverty level. The offset of SNAP benefits works out to about 15 to 20 cents on the dollar for state cash expenditures.

As a thought experiment, consider the state policy-maker raising potential cash benefits by $1000 per family. In the absence of a SNAP benefit change, this would be expected to reduce food insecurity by 0.93 percentage points (column V of Table 5). However, factoring in a $200 offset in SNAP benefits per family, the expected net change in food insecurity is only 0.72 percentage points.

In Table 8, we investigate whether taking multiple programs into account is important by examining how our results would have differed if we had used the "naïve" versions of imputed benefit levels that ignore cross-program eligibility and benefit interactions. Column I replicates the baseline effect (column III of Table 5) of cash and food combined. Column II sums the naïve versions of the variables, constructed ignoring the effect of SSI on TANF and ignoring the effect of SSI and TANF on food assistance. This naïve estimate in column II is approximately half of the magnitude of the baseline specification and is not statistically distinguishable from zero.

Comparing column III (replicated from Table 5 column VII) and column IV (the naïve version) provides some indication why the preferred estimates differ from the naïve estimates. If one does not account for the mechanical relationship between SSI and TANF, the implied effects of TANF reverse sign after controlling for SSI. Similarly, food benefits have a smaller impact in the naïve specification.

Table 8 also shows that when programs are considered one at a time, either accounting for the program interactions when imputing benefits (columns V-VIII) or using the naïve

versions of imputed benefits (columns IX-X), their apparent effects are different. For example, the apparent effect of SSI or TANF potential benefits is larger if one does not account for the fact that most households eligible for these programs are also eligible for food assistance. These results highlight the importance of considering the interactions of programs when examining their impact on measures of family well-being such as food insecurity.

## V. Conclusion

Participation in a range of safety net programs is an important means by which low-income families may respond to the risk of food insecurity. The analysis presented here estimates the effect of major cash, food, and medical safety net programs on food insecurity. We find evidence that a generous cash and food safety net does reduce food insecurity in families with children. The evidence on the effect of public health insurance is inconclusive.

Our findings suggest that each $1000 in cash or food benefits for which families are eligible reduces food insecurity by 1.1 percentage points. These estimates imply that moving from the policies of the 10$^{th}$ percentile state of Kentucky to those of the 90$^{th}$ percentile state of Vermont would reduce food insecurity by 1.8 percentage points on a base of 33 percent.

Although states differ in the composition of their safety net packages, we find no evidence of a significant difference in the effectiveness of food versus cash programs. Under current rules, states lose Federal food assistance dollars when they expand their cash safety net. Though their budgets may suffer, the results presented here suggest that the benefits of a cash expansion would at least offset food insecurity arising from foregone food benefits.

The analysis here also highlights an important methodological issue facing poverty researchers. Low-income families are often eligible for multiple safety net programs. Analyses

that focus only on one program risk overstating or understating the impact of that program on the outcome of interest. Even when program participation arises exogenously, secondary effects on eligibility for other programs need to be considered.

Finally, the analysis highlights the role that the safety net can have in improving the material well-being of Americans. Reductions in food insecurity, a key indicator of material well-being, should be one of the benefits considered when evaluating policy changes to safety net programs. With poverty rates high by recent historical standards, understanding the role of the safety net in alleviating hardship is essential. Our results demonstrate the importance of the safety net in furthering this goal.

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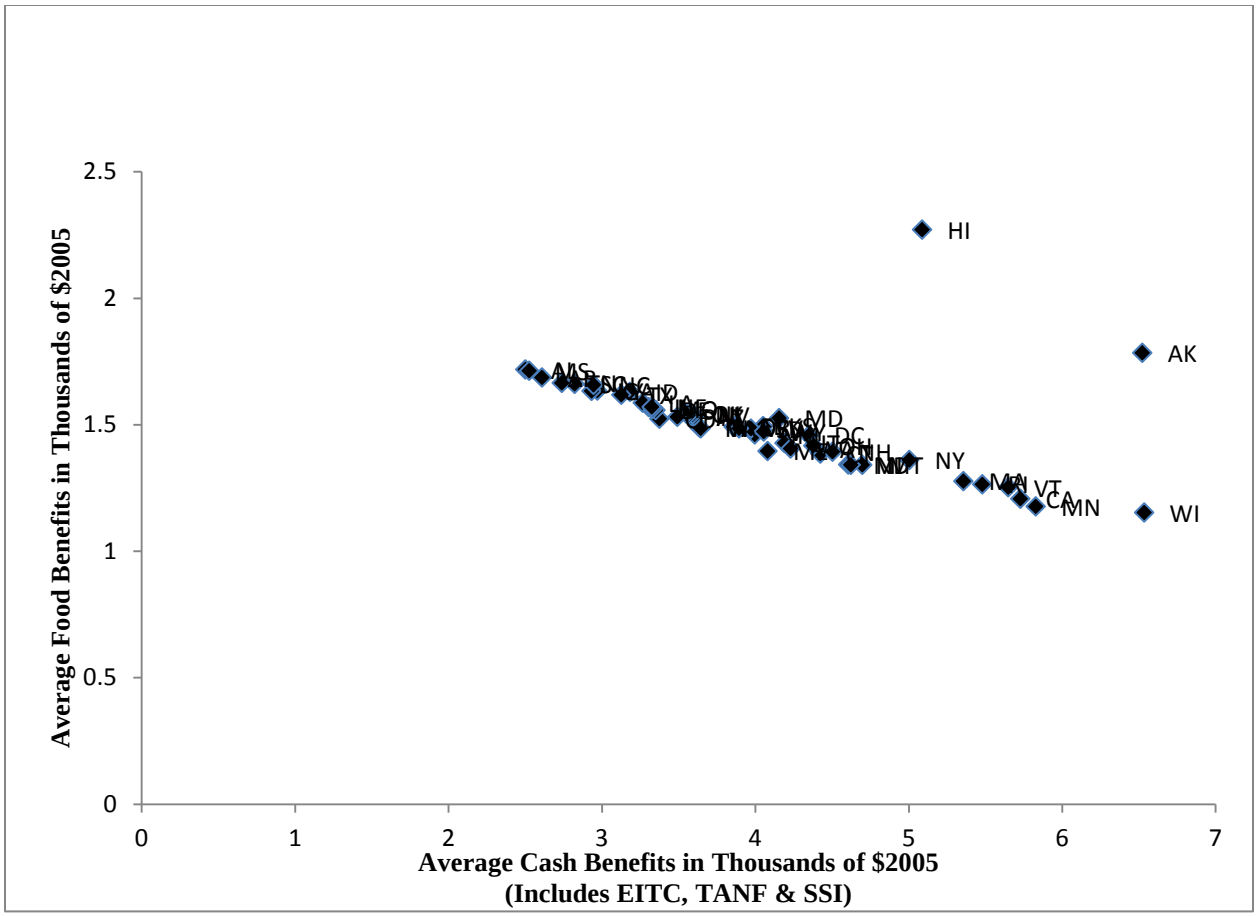


**Figure 1**
*Cash vs. Food For Representative Sample 2001 Policies*
*Single Parent Families <300 Percent Poverty*

**Table 1**
**Multiple Program Participation**
**Non-Immigrant Single-Parent Families Under 300 Percent of the Poverty Line**
**March CPS 2002-2010**

| Fraction with… | Any Family Welfare Reported | Any Family SSI Reported | Any Family EITC Imputed | Any Household SNAP/Food Stamps Reported | Any Family Medicaid Reported |
|---|---|---|---|---|---|
| Conditional On… | | | | | |
| Any Family TANF Reported | 1.000 | 0.149 | 0.493 | 0.866 | 0.999 |
| Any Family SSI Reported | 0.241 | 1.000 | 0.330 | 0.619 | 0.979 |
| Any Family EITC Imputed | 0.071 | 0.029 | 1.000 | 0.285 | 0.538 |
| Any Household SNAP/Food Stamps Reported | 0.270 | 0.119 | 0.616 | 1.000 | 0.897 |
| Any Family Medicaid Reported | 0.173 | 0.105 | 0.646 | 0.498 | 1.000 |
| Unconditional | 0.096 | 0.059 | 0.665 | 0.308 | 0.553 |

**Table 2**
**Summary Statistics (weighted)**
**Non-Immigrant Single-Parent Families Under 300 Percent of the Poverty Line**

| Variable | | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| *Food Insecurity* | Food Insecure | 0.33 | 0.47 | 0.00 | 1.00 |
| *Demographic* | Any Disability in Family | 0.09 | 0.29 | 0.00 | 1.00 |
| | Number of Kids=2 | 0.33 | 0.47 | 0.00 | 1.00 |
| | Number of Kids=3 | 0.13 | 0.34 | 0.00 | 1.00 |
| | Number of Kids= 4 or More | 0.05 | 0.22 | 0.00 | 1.00 |
| | Any Child Under Age 6 | 0.44 | 0.50 | 0.00 | 1.00 |
| | Race/Ethnicity = Non-Hispanic Black | 0.31 | 0.46 | 0.00 | 1.00 |
| | Race/Ethnicity = Hispanic | 0.13 | 0.33 | 0.00 | 1.00 |
| | Race/Ethnicity = Non-White Non-Hispanic | 0.02 | 0.14 | 0.00 | 1.00 |
| | Parental Education = High School | 0.39 | 0.49 | 0.00 | 1.00 |
| | Parental Education = Some College + | 0.44 | 0.50 | 0.00 | 1.00 |
| | Parental Age | 34.43 | 9.28 | 18.00 | 64.00 |
| | Parental Monthly Earnings | 1228.11 | 1132.03 | 0.00 | 5749.54 |
| | Income as a Percent of the Poverty Line | 101.82 | 92.16 | 0.00 | 299.98 |
| | Parental Employment | 0.65 | 0.48 | 0.00 | 1.00 |
| *Policy Controls* | Unemployment Rate | 5.77 | 1.69 | 2.50 | 13.30 |
| | UI Dependent Allowance | 5.15 | 15.66 | 0.00 | 111.00 |
| | UI weeks | 35.08 | 13.29 | 26.00 | 79.58 |
| | Child Support Enforcement Expenditure Per Capita | 17.44 | 7.77 | 0.57 | 95.16 |
| | Non-Cash TANF Expenditures Per Capita | 19.40 | 14.56 | 0.11 | 180.13 |
| | TANF Family Cap | 0.47 | 0.50 | 0.00 | 1.00 |
| | TANF Strict Time Limit | 0.41 | 0.49 | 0.00 | 1.00 |
| | TANF Strict Sanctions | 0.40 | 0.49 | 0.00 | 1.00 |
| | SNAP Standard Utility Allowance (N=27973) | 303.61 | 105.31 | 150 | 744 |
| | SNAP Simplified Reporting | 0.72 | 0.43 | 0.00 | 1.00 |
| | SNAP Electronic Benefit Transfer | 0.96 | 0.18 | 0.00 | 1.00 |
| | SNAP Combined App Project for SSI Recipients | 0.30 | 0.45 | 0.00 | 1.00 |
| | Public Housing Units and Vouchers Per Capita | 0.01 | 0.00 | 0.00 | 0.04 |

Notes: Policy variable definitions described in online appendix. Source is 2001-2009 December CPS and Food Security Supplement and CPS outgoing rotation group. Number of observations = 28194.

**Table 3**
**Annual Means of Program Benefits and Participation**
**Non-Immigrant Single-Parent Families Under 300 Percent of the Poverty Line**

| | Mean | Standard Deviation | Min | Max | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Panel A. Imputed Real Potential Benefits (000s), December CPS* | | | | | | | | | | | | | |
| Cash and Food Combined | 5.71 | 4.90 | 0.00 | 35.20 | 5.40 | 5.48 | 5.58 | 5.62 | 5.64 | 5.53 | 5.57 | 5.90 | 6.59 |
| Cash | 3.96 | 3.62 | 0.00 | 26.30 | 3.91 | 3.90 | 3.95 | 3.91 | 3.95 | 3.86 | 3.92 | 3.94 | 4.24 |
| TANF | 2.02 | 3.07 | 0.00 | 17.26 | 1.94 | 1.98 | 2.07 | 1.99 | 2.06 | 1.89 | 1.96 | 2.02 | 2.22 |
| SSI | 0.62 | 2.07 | 0.00 | 11.82 | 0.64 | 0.55 | 0.56 | 0.58 | 0.61 | 0.65 | 0.64 | 0.62 | 0.67 |
| EITC | 1.32 | 1.54 | 0.00 | 7.36 | 1.32 | 1.37 | 1.31 | 1.34 | 1.28 | 1.32 | 1.32 | 1.30 | 1.34 |
| Food Assistance | 1.75 | 2.20 | 0.00 | 16.33 | 1.49 | 1.58 | 1.63 | 1.71 | 1.69 | 1.67 | 1.64 | 1.96 | 2.35 |
| Fraction Medicaid Eligible | 0.70 | 0.34 | 0.00 | 1.00 | 0.68 | 0.68 | 0.69 | 0.69 | 0.69 | 0.69 | 0.71 | 0.74 | 0.76 |
| *Panel B. Actual Reported Benefits (000s), March CPS* | | | | | | | | | | | | | |
| Cash and Food Combined | 3.47 | 3.70 | 0.00 | 53.96 | 3.30 | 3.30 | 3.38 | 3.39 | 3.48 | 3.44 | 3.38 | 3.54 | 4.01 |
| Cash | 2.22 | 2.67 | 0.00 | 52.32 | 2.29 | 2.24 | 2.25 | 2.18 | 2.24 | 2.19 | 2.15 | 2.14 | 2.26 |
| TANF | 0.32 | 1.34 | 0.00 | 27.14 | 0.35 | 0.35 | 0.41 | 0.32 | 0.35 | 0.31 | 0.26 | 0.25 | 0.26 |
| SSI | 0.41 | 1.91 | 0.00 | 51.00 | 0.41 | 0.37 | 0.35 | 0.40 | 0.47 | 0.42 | 0.38 | 0.40 | 0.44 |
| EITC (imputed) | 1.49 | 1.53 | 0.00 | 7.37 | 1.53 | 1.52 | 1.48 | 1.46 | 1.42 | 1.47 | 1.51 | 1.49 | 1.56 |
| Food Assistance | 1.26 | 2.00 | 0.00 | 14.62 | 1.01 | 1.06 | 1.13 | 1.21 | 1.24 | 1.25 | 1.23 | 1.40 | 1.75 |
| Fraction Family Receiving Medicaid | 0.41 | 0.43 | 0.00 | 1.00 | 0.36 | 0.37 | 0.40 | 0.41 | 0.41 | 0.41 | 0.41 | 0.43 | 0.45 |

**Table 3, continued**

| | Mean | Standard Deviation | Min | Max | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Panel C. Simulated Real Potential Benefits (000s), Fixed December 2001 Sample* | | | | | | | | | | | | | |
| Cash and Food Combined | 5.37 | 3.46 | 1.45 | 26.73 | 5.43 | 5.39 | 5.30 | 5.37 | 5.33 | 5.25 | 5.25 | 5.21 | 5.80 |
| Cash | 3.77 | 2.80 | 1.17 | 22.70 | 3.94 | 3.85 | 3.79 | 3.78 | 3.79 | 3.72 | 3.71 | 3.54 | 3.81 |
| TANF | 1.79 | 1.47 | 0.25 | 13.00 | 1.97 | 1.92 | 1.86 | 1.83 | 1.83 | 1.73 | 1.71 | 1.63 | 1.65 |
| SSI | 0.62 | 1.99 | 0.00 | 11.82 | 0.64 | 0.56 | 0.56 | 0.58 | 0.63 | 0.67 | 0.66 | 0.60 | 0.65 |
| EITC | 1.36 | 0.57 | 0.00 | 3.24 | 1.32 | 1.38 | 1.37 | 1.37 | 1.33 | 1.32 | 1.33 | 1.31 | 1.50 |
| Food Assistance | 1.60 | 1.40 | 0.25 | 9.21 | 1.49 | 1.54 | 1.51 | 1.60 | 1.55 | 1.53 | 1.54 | 1.66 | 2.00 |
| Fraction Medicaid Eligible | 0.68 | 0.18 | 0.21 | 1.00 | 0.68 | 0.66 | 0.66 | 0.67 | 0.67 | 0.68 | 0.68 | 0.69 | 0.70 |
| *Panel D. Naïve Real Potential Benefits (000s), December CPS* | | | | | | | | | | | | | |
| Cash and Food Combined | 6.15 | 5.73 | 0.00 | 42.14 | 5.83 | 5.90 | 6.01 | 6.06 | 6.09 | 5.95 | 5.99 | 6.35 | 7.09 |
| Cash | 4.04 | 3.84 | 0.00 | 27.65 | 4.00 | 3.98 | 4.03 | 3.99 | 4.04 | 3.95 | 4.00 | 4.02 | 4.32 |
| TANF | 2.10 | 3.17 | 0.00 | 17.87 | 2.04 | 2.06 | 2.15 | 2.07 | 2.15 | 1.98 | 2.04 | 2.10 | 2.30 |
| Food Assistance | 2.11 | 2.73 | 0.00 | 18.54 | 1.83 | 1.92 | 1.99 | 2.06 | 2.05 | 2.00 | 1.99 | 2.33 | 2.77 |

Notes: Means are weighted by the CPS Food Security Supplement weights.

**Table 4**
**First Stage: Imputed Potential Benefits Regressed on Simulated Potential Benefits**

| | I | II | III | IV | V | VI | VII | VIII | IX | X |
|---|---|---|---|---|---|---|---|---|---|---|
| Dependent Variable: | Imputed Potential Real Cash & Food Benefits | Imputed Family Medicaid Eligibility | Imputed Potential Real Cash Benefits | Imputed Potential Real Food Benefits | Imputed Family Medicaid Eligibility | Imputed Potential Real TANF Benefits | Imputed Potential Real SSI Benefits | Imputed Potential Real EITC Benefits | Imputed Potential Real Food Benefits | Imputed Family Medicaid Eligibility |
| Simulated Potential Real **Cash & Food** | 0.7231** | -0.0113** | | | | | | | | |
| | (0.0234) | (0.0034) | | | | | | | | |
| Simulated Potential Real **Cash** | | | 0.8080** | -0.0465* | -0.0083* | | | | | |
| | | | (0.0153) | (0.0207) | (0.0033) | | | | | |
| Simulated Potential Real**TANF** | | | | | | 0.7973** | 0.0239 | 0.0182 | -0.1387** | -0.0117** |
| | | | | | | (0.0465) | (0.0166) | (0.0253) | (0.0176) | (0.0035) |
| Simulated Potential Real **SSI** | | | | | | -0.1110** | 0.6936** | 0.1423** | 0.2730** | 0.0058+ |
| | | | | | | (0.0396) | (0.0714) | (0.0285) | (0.0441) | (0.0031) |
| Simulated Potential Real **EITC** | | | | | | 0.2394* | 0.0116 | 0.4947** | -0.2338** | -0.0263* |
| | | | | | | (0.1156) | (0.0297) | (0.0585) | (0.0784) | (0.0129) |
| Simulated Potential Real **Food** | | | -0.0976* | 0.7390** | -0.0179** | -0.1517** | 0.0449** | -0.0035 | 0.7758** | -0.0165** |
| | | | (0.0393) | (0.0249) | (0.0034) | (0.0498) | (0.0109) | (0.0252) | (0.0238) | (0.0032) |
| Simulated **Medicaid Eligibility** | -0.7023 | 0.8183** | -0.8889* | 0.2496 | 0.8234** | -0.5479 | -0.4650* | 0.3101 | 0.1577 | 0.8338** |
| | (0.4580) | (0.0395) | (0.3668) | (0.1938) | (0.0397) | (0.3627) | (0.1920) | (0.1981) | (0.2397) | (0.0464) |
| F Statistic on Instruments | 478.83 | 224.48 | 1385.23 | 413.12 | 178.75 | 272.00 | 23.65 | 43.21 | 240.49 | 107.88 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| P-Value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Notes: Imputed potential benefits determined using actual family earnings; simulated potential benefits determined for a constant 2001 population and matched by cell means. For details, see text. Standard errors in parentheses clustered on state. +, *, and ** indicate statistical significance at the 10, 5, and 1 percent levels. Individual controls include parental age, number of kids in four categories, any child under the age of six, education in three categories interacted with race in four categories interacted with disability status. All regressions include state fixed effects, year fixed effects, and the state-year unemployment rate. Amounts in thousands of real 2005 dollars. Weighted by CPS sample weights. Number of observations=28,194.

**Table 5**
**Impact of Safety Net Programs on Food Insecurity: OLS and Main Instrumental Variables Results**

| | OLS I | OLS II | 2SLS III | 2SLS IV | 2SLS V | 2SLS VI | 2SLS VII | 2SLS VIII |
|---|---|---|---|---|---|---|---|---|
| Imputed Potential Real **Cash & Food** | 0.0073** | 0.0056** | -0.0108* | -0.0110* | | | | |
| | (0.0013) | (0.0016) | (0.0045) | (0.0046) | | | | |
| Imputed Potential Real **Cash** | | | | | -0.0093* | -0.0095* | | |
| | | | | | (0.0042) | (0.0045) | | |
| Imputed Potential Real **TANF** | | | | | | | -0.0038 | -0.0026 |
| | | | | | | | (0.0077) | (0.0074) |
| Imputed Potential Real **SSI** | | | | | | | -0.0082 | -0.0120 |
| | | | | | | | (0.0160) | (0.0164) |
| Imputed Potential Real **EITC** | | | | | | | -0.0482 | -0.0885 |
| | | | | | | | (0.0438) | (0.0795) |
| Imputed Potential Real **Food** | | | | | -0.0143 | -0.0144 | -0.0137 | -0.0083 |
| | | | | | (0.0109) | (0.0106) | (0.0113) | (0.0101) |
| Imputed **Medicaid Eligibility** | 0.0781** | 0.0368* | 0.1116 | 0.0720 | 0.1170 | 0.0785 | 0.1767+ | 0.1791 |
| | (0.0149) | (0.0170) | (0.0748) | (0.1052) | (0.0730) | (0.1047) | (0.0922) | (0.1189) |
| Extra Policy and Econ Controls | No | Yes | No | Yes | No | Yes | No | Yes |

Note: Outcome is Food Insecurity, which includes low food security and very low food security families. Standard errors in parentheses clustered on state. +, *, and ** indicate statistical significance at the 10, 5, and 1 percent levels. Controls are the same as those in Table 4. Additional policy controls are listed in Table 2. Additional economic controls are employment

status, under 100 percent of poverty, and under 200 percent of poverty. Amounts in thousands of real 2005 dollars. Weighted by CPS sample weights. Number of observations=28,194.

**Table 6**
**Impact of Safety Net Programs on Food Insecurity: Alternative 2SLS Specifications**

| | I | II | III | IV | V |
|---|---|---|---|---|---|
| | Baseline | Instruments Based on State-Year Variation Only | Instruments Based on State-Year-Disability Variation Only | Outcome is Employment | Outcome is Income as a Percent of Poverty |
| Dependent Variable: | Food insecure | Food insecure | Food insecure | Employed | Family Income /Poverty |
| Imputed Potential Real **Cash & Food** | -0.0108* | -0.1075+ | -0.0253** | 0.0025 | -0.2631 |
| | (0.0045) | (0.0628) | (0.0060) | (0.0058) | (0.7790) |
| Imputed **Medicaid Eligibility** | 0.1116 | 0.1956 | -0.0069 | -0.0887 | -54.8854** |
| | (0.0748) | (0.1197) | (0.0685) | (0.0684) | (13.4999) |

Note: Standard errors in parentheses clustered on state. +, *, and ** indicate statistical significance at the 10, 5, and 1 percent levels. All regressions include state fixed effects, year fixed effects, and controls in column III in Table 5. Amounts in thousands of real 2005 dollars. Weighted by CPS sample weights.

**Table 7**
**Alternative Outcomes and Components of Food Insecurity**

| Outcome | Coefficient on Imputed Potential Real Cash & Food Benefits |
|---|---|
| Food Insecure | -0.0108* |
| | (0.0045) |
| Very Low Food Security | -0.0028 |
| | (0.0043) |
| Need More to Meet Food Needs of Household | -0.0114+ |
| | (0.0065) |
| Last 12 Months Ever Ran Short of Food Money | -0.0137** |
| | (0.0052) |
| Last 12 Months Sometimes/Often Not Enough | -0.0075** |
| Food to Eat in Household | (0.0029) |
| Last 12 Months, Sometimes/Often Worry about | -0.0043 |
| Running Out | (0.0044) |
| Last 12 Months, Sometimes/Often Food Bought | -0.0074 |
| Didn't Last and Didn't Have Money to Buy More | (0.0045) |
| Last 12 months Sometimes/Often Couldn't | -0.0057 |
| Afford to Eat Balanced Meals | (0.0064) |
| Last 12 Months Ever Cut Meal Size or Skip | -0.0081 |
| Meals b/c Not Enough Money for Food | (0.0050) |
| Last 12 Months Ever Ate Less Than You Felt | -0.0126** |
| You Should b/c Not Enough Money for Food | (0.0049) |
| Last 12 Months Ever Hungry but Didn't Eat b/c | -0.0094* |
| Not Enough Money for Food | (0.0038) |

Note: Each cell represents coefficient on cash and food combined from a separate 2SLS regression. All models include same controls as Column III of Table 5.

**Table 8**
**Naïve Estimates of the Effects of the Safety Net on Food Insecurity**

| | I | II | III | IV | V | VI | VII | VIII | IX | X |
|---|---|---|---|---|---|---|---|---|---|---|
| | Regular | Naïve | Regular | Naïve | Regular | Regular | Regular | Regular | Naïve | Naïve |
| Imputed Potential Real **Cash & Food** | -0.0108* | -0.0049 | | | | | | | | |
| | (0.0045) | (0.0031) | | | | | | | | |
| Imputed Potential Real **TANF** | | | -0.0038 | 0.0012 | -0.0106+ | | | | -0.0090+ | |
| | | | (0.0077) | (0.0086) | (0.0062) | | | | (0.0047) | |
| Imputed Potential Real **SSI** | | | -0.0082 | -0.0144 | | -0.0201+ | | | | |
| | | | (0.0160) | (0.0163) | | (0.0112) | | | | |
| Imputed Potential Real **EITC** | | | -0.0482 | -0.0475 | | | -0.0116 | | | |
| | | | (0.0438) | (0.0475) | | | (0.0369) | | | |
| Imputed Potential Real **Food** | | | -0.0137 | -0.0054 | | | | -0.0148 | | -0.0071 |
| | | | (0.0113) | (0.0099) | | | | (0.0109) | | (0.0068) |

Notes: Columns I to IV include controls for Medicaid family eligibility. All columns include controls in column III of Table 5.

"Regular" indicates cross-program eligibility and benefit interactions are accounted for in the potential benefits calculation, while

"Naïve" indicates that such interactions are ignored in the calculation.

1. http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#.UkWSxT_qWfY. For more detail on definitions of food security and insecurity, see Section II.

2. See, for example, Ouelette et al. (2004), which notes that most measures of material hardship incorporate food security as a component.

3. Additional evidence on correlates of food insecurity can be found in Cook et al. (2006); Skalicky et al. (2006); Eicher-Miller et al. (2009); Huang, Oshima, and Kim (2010); Kirkpatrick, McIntyre, and Potestio (2010); and Howard (2011).

4. As food insecurity is measured at the household level, we apply the household-level measure to each family living in the household. Almost 20 percent of families in the sample are CPS-defined sub-families living in the household of another primary family, and in 37 percent of those cases the primary family is also in the sample. Unmarried childless adult children are considered part of the family and we incorporate them as appropriate under the rules of the safety net programs.

5. We exclude immigrant families because program eligibility rules are different for this group and are hard to characterize without information on legal status. Overall, sample restrictions regarding respondent age, immigrant status, presence of children, and data completeness reduce the sample from about 348,000 families to 117,000 families. Of these, about 28,000 are the single parent families under 300 percent of the poverty line that are the focus of the study.

6. Very few families over 300 percent of poverty are eligible for any of the programs we examine. Single parent families under 300 percent of the poverty line have a rate of food insecurity of 33 percent, compared to 20 percent for married families under 300 percent of poverty.

7. Disability status is reported only for those ages 15 and up.

8. Employment and earnings are observed by matching with CPS outgoing rotation group data (detailed below).

9. Schmidt, Shore-Sheppard, and Watson (2013) implements a two-sample procedure to investigate participation rather than eligibility, but the findings are not substantively different and we do not include them here.

10. For comparison, Neumark and Kawaguchi (2001) reports a match rate of 74 percent across a 12-month window in the Current Population Survey. It is not surprising that our match rate is higher given that our longest window is three months. Neumark and Kawaguchi argue that bias stemming from attrition in the CPS is likely to be minimal. Reported food insecurity is similar for our matched and unmatched samples.

11. An additional source of error is that earnings are measured at some point between December of the reference year and March of the subsequent year, whereas the relevant earnings for actual determination may occur as early as the year prior to the reference year. Analysis of the March CPS suggests that "current" weekly earnings of the respondent have a correlation of 0.43 with prior calendar year annual earnings among single parent families under 300 percent of poverty.

12. Analysis of the March CPS, which includes information on both earned and unearned income, suggests that unearned income other than cash welfare is not a large concern among single parent families under 300 percent of poverty. For 50 percent of such families with

positive total income, unearned income is less than 1 percent of total income. About a third of the unearned income in this population stems from non-means-tested government benefits like Social Security and Social Security Disability Insurance.

13. The online appendix can be found at http://jhr.uwpress.org/.

14. Additional policy parameters include: the dependent allowance for unemployment insurance, maximum number of weeks of UI in the state during the reference period, child support enforcement expenditure per capita, SNAP standard utility allowance, SNAP simplified reporting, SNAP electronic benefit transfer, SNAP combined application for SSI recipients, TANF family caps, TANF strict time limits, TANF strict sanctions, non-cash TANF spending per capita, and public housing and voucher units per capita. Details on these variables can be found in Schmidt, Shore-Sheppard, and Watson (2013).

15. We control for the state unemployment rate to account for the fact that states may change policy parameters in response to economic conditions. In addition, some specifications control for family economic conditions such as employment or poverty status.

16. Because the poverty line is higher for Alaska and Hawaii, the simulated sample for these two states is not identical to the simulated sample from the other states. Results are not sensitive to excluding Alaska and Hawaii.

17. One concern with using disability status to define cells is that self-reported work limitations in the CPS have been increasing over our sample period (Burkhauser, Houtenville, and Tennant 2014), and there is some evidence that self-reported work limitations respond endogenously to economic conditions (Waidmann, Bound, and Schoenbaum 1995). This would tend to bias the estimated effect towards zero, as movement into reported disability status would tend to raise imputed benefits and to be associated with more food insecurity. We estimate regressions that

rely only on state-year variation in policies and would not be subject to this bias. The coefficients, presented in Table 6, are larger in magnitude as expected.

18. It should be noted that the strength of the first stage is misleading to the extent that there are errors in the benefit calculators for a given state-year-demographic cell. Errors will be reflected in both simulated potential benefits and imputed potential benefits, generating a spurious correlation between the instruments and the endogenous regressors. There is no reason to suspect these errors would be associated with food insecurity, however.

19. This calculation uses the fact that each dollar of simulated cash and food benefits is associated with a 72-cent increase in imputed benefits, as shown in column I of Table 4. The less than one-for-one relationship stems from the fact that more generous state-years tend to have fewer residents who qualify for assistance.

20. This calculation reflects imputed potential benefits for single-parent families under 300 percent of the poverty line in 2001.

21. The $555 increase in the package of potential benefits in the fixed simulated sample included a $458 increase in food assistance and a $168 increase in the EITC, offset by declines in TANF.

22. In other analyses (not shown), we find that the estimated coefficient on the cash and food package is unaffected if we exclude the unusual states of Alaska, Hawaii, and the District of Columbia. We also perform a parallel analysis for married-parent families and find no comparable effect of the safety net on food insecurity for married-parent families.