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Understanding Food Insecurity during the Great Recession

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Abstract

The goal of this work, by the Spring conferences, is to examine the role that government programs played in affecting food insecurity during the Great Recession. By merging the March surveys and the Food Security Supplements of the CPS, we will combine information on food security, income, and program participation. Both poverty and food insecurity rose dramatically during the Great Recession, but during 2008 and 2009, food insecurity rates were higher than poverty rates for the first time since data on food security began to be regularly collected. The results of the project thus far, documented in the paper below, show the changes in food insecurity over time and that food insecurity is more closely linked to unemployment than poverty. Further, during the Great Recession, food insecurity has affected families not historically thought of as "the poor." Using methodologies designed to yield causal insights (differences-in-differences, instrumenting participation with eligibility, and regression discontinuity), we will examine the role that SNAP, TANF, Social Security, and EITC have played in food insecurity during the Great Recession.

Introduction

Food insecurity rates have closely tracked poverty rates in the United States in recent years, and both have trended up since 2000. With the onset of the recession in 2008, however, food insecurity rates spiked and are far above the level predicted by the poverty rate, as seen in Figure 1. In 2007, 11 percent of households were deemed food insecure, and by 2008 that had climbed to over 14 percent, and was higher than the percent of households in poverty. By 2010, the poverty rate rose to 15.1 percent, and the food insecurity rate remained above its historical levels at 14.5 percent. [1]

Food insecurity, and the policies that combat it, are critical issues. Access to adequate amounts of healthy food is of primary importance to health and well-being, and food insecurity may have lasting consequences, particularly for children. Recent work in developmental biology (summarized in Gluckman and Hanson 2005) has shown that inadequate availability of nutrition during certain critical periods of a child's development causes irreversible damage to brain functioning and future health.[2] Even with this increased awareness of the importance of resources during childhood, the fraction of children living in food-insecure households has increased from 16.9 percent in 1999 to 23.2 percent in 2009. Over that same time period, the fraction of children living in

[1] See http://www.ers.usda.gov/briefing/foodsecurity/stats_graphs.htm#food_secure and http://www.census.gov/hhes/www/poverty/data/incpovhlth/2010/index.html

[2] In recent work, Almond, Hoynes & Schanzenbach show that the introduction of Food Stamps in the 1960s and 1970s improved infant health (2011) and also improved *adult* health outcomes among the cohort that were exposed to the program in early childhood (Hoynes, Schanzenbach and Almond 2012). These findings demonstrate that food insecurity is critical *and* that policy intervention can be effective in addressing it. See also Gundersen and Oliveira (2001), Gundersen and Ziliak (2003), and Borjas (2004).

households with *very low* food security among children almost doubled, from 0.7 percent to 1.3 percent.

This study first examines aggregate economic indicators over time to look for ways in which the Great Recession is different from other periods, including its differences from other recessionary time periods. Are the things that are "worse" during this recession, things that, intuitively, should be associated with Food Insecurity (FI)? Figure 1 suggests that food insecurity is not only higher than in previous periods, but that its relationship with poverty has changed. We further examine whether the relationship between food insecurity and other aggregate measures of economic health have changed. We then examine whether the characteristics (e.g., race, ethnicity, and education levels) and behavior (e.g., consumption of fast food) of food insecure households have changed relative to food secure households during the Great Recession, and we consider the implications of these changes. Finally, we discuss the role of policies in combating FI during the Great Recession and describe plans for future work.

Prior Literature on Food Insecurity

Prior research has described how households with different food security status compare in terms of background characteristics, total food spending, and dietary intake. Food insecure households both spend less on food and earn less (Cristofar & Basiotis 1992, Nord et al. 2010) and are more likely to have a non-white head (Nord et al. 2010, Gunderson 2008). Households in which the mother is depressed (Siefert et al. 2004) or was maltreated as a child herself (Wehler et al. 2004) are more likely to be food insecure.

Researchers have also found that individuals from food insecure households have worse nutrient intakes and/or lower total calorie intakes (see Kaiser & Townsend 2005 for a review, also Cristofar & Basiotis 1992, Bhattacharya et al. 2004, Rose & Oliveira 1997, Casey et al. 2001). There is mixed evidence about whether food insecurity is linked to obesity (see Dinour et al. 2007 for a review, also Dietz 1995, Alaimo, Olson & Frongillo 2001, Bhattacharya, Currie & Haider 2004, Dinour et. al. 2007, Martin & Ferris 2007, Rose & Bodor 2006). Those in food insecure households also have worse health status (see review by Kaiser & Townsend 2005) and worse cognitive development (Winicki & Jemison 2003; Kaiser & Townsend 2005).

An eventual goal of this project, not included in the current paper, is to add to the descriptive literature by examining time use and expenditure patterns by food security status more broadly. We also plan to examine patterns of dietary intake for all household members in food secure and insecure households. [3]

Data Sources

In this preliminary study we have used two sources of data, the Current Population Survey Food Security Supplement (CPS-FSS), from 1998-2010,[4] and the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2008. The Current Population Survey is a monthly labor survey conducted by the Census Bureau for the Bureau of Labor

[3] This work will add to the growing research on differences in time use and expenditure patterns among different types of individuals and families. Krueger and Mueller (2008 & 2010) investigate time use among the unemployed; Guryan, Hurst, and Kearney (2008) examine differences in time use among parents across different socio-eonomic status groups; DeLeire and Kalil (2005) investigate spending patterns for co-habiting vs. married couples; Levy and DeLeire (2008/2009) examine spending patters among those without health insurance.

[4] There are food security supplements of the Current Population Survey in 1995, 1996, and 1997. However, food insecurity is consistently measure from 1998 forward, so we are focusing on these years in this study. Adjustments can be made to make the data comparable prior to 1998 (Andrews et al. 2000, Ohls et al. 2001), however including those earlier years will not yield an additional recessionary period.

Statistics.[5] Once per year, the households in the survey are asked an additional battery of questions about food security, food expenditures, and use of food and nutrition assistance programs. The data are nationally representative, include over 50,000 households, and are the source data for the USDA's annual reports on household food security. The CPS data are rich and contain not only food security information, but also demographic, geographic, and labor force information. We use these data to examine overall food insecurity, components of food insecurity, and the correlation between individual and household characteristics and food insecurity over time.

To determine how food consumption varies by food security status, and whether that changed during the Great Recession, we use National Health and Nutrition Examination Survey data from 1988 through 2010.[6] The NHANES data are nationally representative, and include detailed data about individual health and nutrition. Some of the information is collected via a medical exam and other information, such as food security, is collected via survey. Using the NHANES data we are able to examine changes in food security, and changes in diet and health status that are likely related to low food security. [7]

Defining Food Insecurity

[5] Note that the CPS can also be linked to the American Time Use Survey for 2003-2009 (as of this writing). In future drafts, we plan to investigate how time use varies by food security status, before and during the Great Recession.

[6] This includes NHANES III (1988-94), and six waves of the continuous-sample NHANES (99-00, 01-02, 03-04, 05-06, 07-08, and 09-10).

[7] The food security questions change over time; for the years used in the current draft, we can consistently define food insecure households based on the original data. In future versions, we will adjust these measures to allow for maximum comparability. There are also changes in other important aspects of the NHANES, such as the fact that family size is captured in the earlier NHANES and household size in the later NHANES (see Anderson, Butcher, and Schanzenbach 2009).

Food security status is determined by a battery of questions asked during the survey of the household. There are 10 questions asked of all households, and an additional 8 questions asked of households with children. Table 1 (see Bickel et. al. 2000) shows the questions included in the battery. There are four kinds of questions: those that capture anxiety or perception that the food budget or supply is inadequate in quantity. There are also questions that capture whether food is perceived to be inadequate in quality. A group of questions are more quantitative in nature, asking about instances where food intake was reduced or weight loss occurred associated with reduced food intake. One set of these questions pertains to adults and the other to children in the household.

Answering more of these questions affirmatively indicates a more severe degree of food insecurity. For example, for the battery of questions in the Current Population Survey, "very low food security among children" is equal to 1 if 5 or more of the 8 child centered food security questions are answered affirmatively (Nord et al. 2009), and zero otherwise. The standard battery of questions, and the screening or skip logic for the battery, has changed over time as thinking about food security and hunger has changed, although as mentioned above, for the CPS-FSS, the battery and screening has been consistent since 1998.

Figures 2 and 3 show the percent of households answering affirmatively to each of these items from 1998 through 2010. The vertical line indicates 2008, the beginning of the Great Recession. Figures 2a and 2b present results for the items that refer to adult food consumption and Figures 3a and 3b are for items that specifically refer to children's food consumption. (Note there is an error for 2007 for two of the items – this will be fixed in the

next version of the paper).[8] Some components of food insecurity, for example being worried that food will not last, are much more common than others, for example children going a whole day without eating. The higher prevalence items are in Figure 2a and 3a, and the lower prevalence items are in 2b and 3b, so that the patterns are not obscured by the scales.

It is clear looking across all the items that food insecurity is higher in worse economic periods. Some of the items appear more variable than others, but all have increased during the period of the Great Recession. This, of course, is not unexpected. The "Great Recession" is the worst economic contraction since the Great Depression. To the extent that there are more individuals in poverty, we would expect that there would be more food insecure individuals as well. However, Figure 1 suggests that food insecurity is high both because the poverty rate increased AND because for a given poverty rate, there are more people reporting they are food insecure.

How is the Great Recession Different?

In this section we examine aggregate economic indicators to see what appears different about the Great Recession from other periods of economic contraction. Are there differences that, intuitively, would suggest that food insecurity would be especially high during this recession?

[8] The skip logic for the food insecurity battery is not straightforward. Many of the questions do not get asked unless the household is poor, and some of the questions pertaining to more severe forms of food insecurity are not asked unless earlier questions were answered affirmatively. Thus, if one wants to know the percent of all households that are food insecure, not the percent of poor households, one has to be careful about the skip logic, and coding some missings to 0, if the household was not asked, as opposed to true missings where the household refused to answer or did not know. There was a change in 2007 in the coding of missing data (e.g., the meaning of -9,-4,-3, or -1 changed) that we did not catch for these two items for this draft.

Figures 4a-4e present data from the Federal Reserve Economic Data (FRED) series.[9] As is well-known, Figure 4a shows the very high and sustained unemployment rates during this recession. Although peak rates were higher in the 1980 recession, they declined more rapidly. The Great Recession is also distinguished by very long duration of unemployment. Figure 4b shows that median duration of unemployment has been dramatically higher than in earlier downturns. Figure 4c shows the decline in housing prices that has been a focal point of the Great Recession. While housing prices and unemployment have been thoroughly discussed during this recession, food prices have received relatively less attention. Inflation overall has been low, as is often the case in periods of economic contraction, however, food prices have been relatively high. Figure 4d shows the CPI for food scaled by the "core" CPI, the price index less prices for food and energy, which tend to be more volatile. Energy prices scaled by core CPI (not reported) shows a similar pattern. Thus, although core inflation has been low, price levels and growth for food and energy have been relatively high compared to all earlier periods for which we have data, except for the downturn in 1980. Energy, while not directly related to food consumption, is a necessity and tends to be inelastically demanded and to take up a larger share of the budgets of low-income families. Thus high energy prices may have in important indirect effect on food security, while high food prices, obviously, can directly affect a family's ability to secure adequate amounts of food.

Finally, Figure 4e presents data on Consumer Sentiment. The Great Recession saw a precipitous drop in consumer sentiment to levels on par with the recession of the early 1980s.

[9] http://research.stlouisfed.org/fred2/

In sum, the Great Recession is a period of high unemployment rates with very high unemployment duration. At the same time, many of those who owned homes saw the prices of their homes plummet and their ability to use the equity in their homes to weather a period of sustained unemployment fall. In addition, prices for necessities like food and energy were relatively high, leading to a particularly strained budget. Taken together, these macroeconomic facts may be contributors to the increase in food insecurity during the Great Recession.

Analysis

In this section we first use the CPS-FSS data and data on poverty and unemployment to examine the relationship between food insecurity and macro economic indicators to determine the extent to which the relationship between FI and the macro economy appears to be different during the Great Recession. We then examine how the characteristics of the food insecure have changed during this period. Finally, we turn to the NHANES data to see how food consumption patterns have changed between the food secure and insecure during this period.

Examining the Relationship of Food Insecurity to Poverty and Unemployment

Figure 1 indicates that food insecurity is aberrantly high during the Great Recession. In all previous periods, food insecurity tracked poverty rates, but in this period, food insecurity shot up above the poverty rate. Here we further examine this relationship. First, we run regressions with an indicator variable for overall food insecurity or one of its components on the left-hand-side and the U.S. annual poverty rate on the right-hand-side.

We then take the residuals from that regression and run it on an indicator for the Great Recession years (2008 forward). If that indicator is statistically significant, it suggests that the Great Recession is, indeed, "different" from other periods. We follow this two-step process to ensure that we allow the macroeconomic indicator (the poverty rate in this case) to have the first crack at explaining food insecurity, before the more flexible control for the later years.

We then try that exercise with other measures that capture economic conditions: the US unemployment rate and the state unemployment and state poverty rates. We do this exercise for not only an indicator of 12 month food insecurity status, but also for each of the 18 elements that go into constructing food insecurity measures for adults and children. These regressions are run using pooled data from 1998-2010, merged with measures of unemployment and poverty.[10] We use one observation per household, weighted by the household supplement weight, and adjust the standard errors to allow for arbitrary forms of heteroskedasiticty and for correlation within calendar year across households.

Consider the first column of Table 2. This indicates that, indeed, as the US poverty rate increases, so does the food insecurity rate. Column 2 then uses the residual from this regression as the dependent variable and regresses that against a dummy for the Great Recession. The statistically significant (at the 5.6% level) coefficient of 0.0139 indicates that food insecurity is about 1.4 percentage points higher than expected during the Great Recession. In other words, poverty increased and that explains a portion of why food

[10] Unemployment measures come from the BLS, LAUS series(http://www.bls.gov/lau/). The poverty measures come from the Census Bureau's SAIPE series (http://www.census.gov/did/www/saipe/). In future versions of the paper we will examine alternative poverty measures that incorporate non-cash element of the safety net (notably Food Stamps, WIC, etc).

insecurity is high in the Great Recession. However, there is an additional 1.4 percentage points of "excess" food insecurity given the historical relationship between poverty and food insecurity. The third and fourth columns repeat that exercise, but use the U.S. unemployment rate as the explanatory variable. Recall that unemployment is particularly high during this period. When we run the residual from this regression against the indicator for the Great Recession, we no longer find that the Great Recession has higher than expected food insecurity, given the high unemployment status. The coefficient on the dummy variable in this regression is much smaller (0.005 vs. 0.014) and is not statistically different from zero at anything close to standard significance levels.[11] In column 5 we run a "horse race" between U.S. poverty and U.S. unemployment rates in terms of "explaining" food insecurity. Once the unemployment rate is included, poverty rates are no longer statistically significantly correlated with food insecurity. The relationship between the Great Recession indicator and the residual of this regression is nearly identical to when unemployment is entered on its own. Columns 7-10 repeat this exercise including state poverty rates in the regression. In other results, not shown here, we have included other local measures of poverty and unemployment, and even measures of whether the household itself is poor. No matter which of these other measures are included in the regression, national unemployment rates are always significantly related to food insecurity rates, and once they are included, the Great Recession indicator is no longer significantly related to the residual.

We went through an identical exercise for each component of food insecurity and find results that are largely consistent with those described for the overall measure of food

[11] Note, though, that the 95% confidence interval for this estimate includes not only zero, but also values larger than the 0.014 estimate found when using poverty in the first stage.

insecurity. In general, the higher prevalence food insecurity items are those that are aberrantly high given the poverty rates during the Great Recession. Some of the very low prevalence outcomes, such as children going a whole day without eating, are very difficult to explain with either poverty or unemployment rates during any period. For the sake of brevity, we show results from the specifications like those in the top panel of Table 2 for only the highest and lowest prevalence item for adults and children. Thus, the top panel of Table 3 shows the results for an indicator that the household respondent reported that he or she was often "worried whether our food would run out before we got money to buy more," the highest prevalence item in the food security battery. The second panel uses as a dependent variable an indicator for whether the respondent and other adults in the household ever did not eat for a whole day. The top panel shows that households report a higher level of worry about food insecurity than one might expect given the poverty rate, but once the national unemployment rate is included in the regression, the Great Recession is not a period of "excess" worry. For the lower prevalence indicator of more severe food insecurity, the Great Recession does not appear to be aberrantly high given either the poverty or the unemployment rate. As column 5 shows, even when poverty rates are held constant, the unemployment rate continues to have a statistically significant association with these items of food insecurity. Similarly, for children's food insecurity items in Table 4, the Great Recession has aberrantly high rates of relying "on a few kinds of low-cost food to feed the children because we were running out of money to buy food" given the poverty rate. However, it is not aberrantly high given the unemployment rate. Finally, panel 2 of Table 4 shows that neither variation in the national poverty rate, nor in the national unemployment rate, can explain the incidence of children going a whole day without eating.

We began this section with the puzzle of why the relationship between poverty and food insecurity had changed during the Great Recession, and found that a strong relationship between the unemployment rate and food insecurity holds both before and after the Great Recession. These results suggest that the high unemployment rate during the Great Recession is predicting food insecurity before it predicts poverty. That is, food insecurity appears to be striking individuals who do not, or do not *yet*, meet the official criteria for being poor. Given that the poverty line is based on the income necessary for adequate food intake, the finding that the unemployment rate, rather than the poverty rate, is the better predictor of food insecurity is a bit of a puzzle in itself. It is clear, then, that further investigation into the role of the Great Recession on food insecurity is necessary. We continue this investigation in the next section, where we describe the ways in which the characteristics of the food insecure have changed over this time period.

Who Are the Food Secure and the Food Insecure?

In this section we examine how the food insecure and the food secure differ and whether those differences have changed during the Great Recession. This is a purely descriptive exercise which, hopefully, will give insights into the role played by the Great Recession in raising food insecurity to such high levels. In Tables 5-7 we present means for a series of characteristics for both the food secure and the food insecure, broken out into before the Great Recession (1998 to 2007) and after. We also show the relative change in means during the Great Recession for the food insecure versus the food secure. This relative change is computed by first subtracting the mean (of a given variable) for the food insecure prior to the Great Recession from the mean for the food insecure during the Great

Recession. We then calculate this same pre/post-Great Recession difference for the food secure and subtract it from the previously calculated difference for the food insecure. The last column shows the p-value indicating whether this relative change is statistically meaningful. Table 5 presents the means for gender, race, marital status, educational attainment, disability status, and whether the individual lives in an owner occupied home. Table 6 shows the change in employment outcomes among the food secure and food insecure. Table 7 shows changes in food related safety net programs: Supplemental Nutrition Assistance Program (SNAP/Food Stamps) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Consider the first row in Table 5. This shows that about 51 percent of the food secure were female prior to the Great Recession, and that this fraction fell slightly to 50.9 percent during the Great Recession. At the same time, prior to the Great Recession, 53 percent of the food insecure were female, and this fell to 52 percent during the Great Recession. The relative change is small, but significantly different from zero, and implies that food insecurity became slightly less concentrated among the female population during the Great Recession. Similarly, although the food insecure are more likely to be in female headed households, and especially female headed households with children, than are the food secure, the relative shares of these types of households shrank significantly during the Great Recession. Turning to educational attainment, as expected, the food secure are less likely to be high school dropouts than are the food insecure. However, the proportion of the food insecure with the lowest levels of education fell, relatively, during the recession. The proportion of the food insecure with a college degree or higher also fell, relatively, during the recession. The other two remaining educational categories, some college and a

high school degree, increased their share among the food insecure. Thus, it appears that food insecurity increased relatively more during the Great Recession for middle education individuals.

Like the lower education groups, African Americans comprise a larger share of the food insecure, but their relative share among the food insecure fell during the Great Recession. Similarly, disabled individuals comprise about 3.5 to 4 percent of the food secure group, while disability is much more common among the food insecure at 12 to 13 percent; again, the relative share of this group among the food insecure declined during the Great Recession. Finally, the relative share of the food insecure who lived in an owner-occupied home increased by about 2.5 percentage points during the Great Recession.

In sum, Table 5 indicates that during the Great Recession food insecurity became relatively more prevalent among groups that are historically better off (such as those with intermediate levels of education, or who live in owner occupied housing), and became relatively less prevalent among groups that are historically worse off (such as female-headed households and African Americans). This finding that those traditionally thought of as among the poor are relatively less represented among the food insecure during the Great Recession seems consistent with the previous finding that the national poverty rate did not do a very good job of predicting food insecurity during the Great Recession.

Table 6 turns to examining reported labor force status among the food secure and insecure. Although the probability of being employed has fallen during the Great Recession, regardless of food security status, there has not been a significant relative change in the probability of being employed. There has, however, been a relative shift in

other employment categories. For example, the relative probability of being unemployed[12] has risen by about 2.5 percentage points among the food insecure. The duration of unemployment has also relatively risen for the food insecure. The probability of being "not in the labor force" has relatively declined among the food insecure, and the probability of being self-employed has relatively increased. In sum, during the Great Recession, the food insecure are more likely to be unemployed, unemployed for longer, and self-employed than are the food secure, and they are less likely to be out of the labor force. This finding of a relative increase in the number of the unemployed and the long-term unemployed within the food insecure group is not inconsistent with the previous findings that the national unemployment rate is an important predictor of food insecurity.

Finally, Table 7 summarizes the change in participation in food assistance programs before and during the Great Recession. It is worth reiterating here that this is a purely descriptive exercise. There is likely to be selection into who participates in these nutrition programs so we cannot speak to, for example, counterfactual food security status among those who do and do not participate in nutrition programs. We can see, however, that participation in food stamps, and the monthly amounts received, increased relatively for the food insecure during the Great Recession. Participation in WIC, for which eligibility is more categorical, however, was unchanged.

Interpreting the changes in observed SNAP receipt is difficult. Clearly, if there had been no increase in SNAP receipt among those who qualify as food insecure, that might have indicated either a lack of eligibility or a lack of knowledge of programs – both of which

[12] Note that this is from the individual labor force status questions in the month in which the FSS supplement was administered in that year. Since 2001, that has been in December – thus this number may differ substantially from the average annual unemployment rate.

are possible given the implication from the earlier tables that the food insecure during the Great Recession appear to be coming from households that are better off (at least in terms of education levels and home ownership). What one would really like to know is whether SNAP participation and payments went up "enough" during the Great Recession to compensate for the increase in need. We plan to explore this question in future versions of this paper. Merging the FSS supplement with the March Annual Demographic Survey (for those individuals in rotation groups which can be linked), for example, will allow us to have a fuller understanding of the income levels and program participation patterns among the food secure and insecure.

Food Consumption and Nutrition

We now turn to the National Health and Nutrition Examination Surveys (NHANES) to see how food consumption and nutrition differ between the food secure and insecure and whether these differences changed over the Great Recession. The NHANES uses dietary recall diaries to collect information on food consumed, and provides an analysis of the nutritional content of that food. It also collects information on where the food has been consumed: in a restaurant, at home, in a feeding center etc. As discussed earlier, the NHANES data cover different periods than the CPS-FSS. In particular, the NHANES survey is in the field for two-years, and data is released that is representative at that two-year period. While many data items are available for the 2009-2010 period, the entire survey is not yet available. The dietary information was released in September 2012, but the food

security battery is not yet available.[13] Thus, the current version of the paper uses only data from the 2007-2008 NHANES to represent the Great Recession period for this analysis. There are two problems with this choice. First, we only have one observation for the recession period. Second, almost half of the data from this period actually come from before December 2007 (when the Great Recession began). The result is that our estimated relative changes may be biased toward zero.

Turning to Table 8, on average, the food secure ate 3.9 meals per day, while the food insecure ate 3.7, in the years prior to the Great Recession. While meals per day grew for both groups, the differences expanded, with the food insecure consuming relatively fewer meals during the Great Recession. Despite this, differences in total calories consumed and in Body-Mass-Index (BMI) show no statistically significant relative change over the Great Recession years. Interestingly, there is a relative increase in percent of meals consumed at "fast food" restaurants, and this increase is statistically significant at the 10 percent level.

In future versions of this work, we plan to link the CPS-FSS with the American Time Use Survey (ATUS). Fast food consumption has been linked to time constraints (due to mothers' working, overscheduled children, etc.) and it will be interesting to see whether there is a relative shift in time use in the household that is consistent with this reported relative increase in fast food consumption. Alternatively, it may simply be the case that the relative price of fast food declined during the recession, making these meals a cost-effective source of calories.

[13] For the 2007-2008 NHANES, the food diary data was released in May 2010 and the food security battery in July 2010. Thus, data releases are occurring later in the year for the 2009-2010 NHANES, but if the relative lag holds, we hope for the latest food security data to be available in November 2012.

The second panel of Table 8 shows reported consumption of particular nutrients for adults. There was no statistically significant relative change in nutrient consumption for the food insecure relative to the secure when children were included. However, focusing on adults, we see that the food insecure are consuming relatively less of all the listed nutrients and these relative declines are statistically significant at conventional levels for phosphorus, iron, and fiber. These shifts seem consistent with the relatively higher reliance on fast food seen in the top panel. Recall, however, that these NHANES results should be considered quite preliminary until we can incorporate the 2009-2010 round of the survey, and thus measure the recession years a bit better that we currently are able to.

Discussion

This paper presents evidence on how food insecurity has changed over the last several years. Food insecurity is higher during the Great Recession than during any other period for which we have national food insecurity information. There are many reasons why the Great Recession might be expected to be linked with particularly high food insecurity. In particular, unemployment rates are high and unemployment duration is double what it was even in the deep recession of the early 1980s. At the same time, housing prices have fallen and many families, even those considered middle class, lost their ability to use their housing equity to smooth periods of unemployment. In addition, food and energy prices have been relatively high during this period.

Our goal with this research is to document how food insecurity has changed during the Great Recession, to understand the consequences of that change, and to understand how social programs did or did not help to ameliorate food insecurity. This preliminary

paper is the first step in that process. Our initial motivation is the realization that while the poverty rate has traditionally been a good predictor of food insecurity, this relationship structurally changed during the Great Recession. We first document this fact, while additionally showing that the unemployment rate appears to be a better predictor of food insecurity, both historically and throughout the Great Recession.

We then explored relative changes in the characteristics of the food insecure during the Great Recession (versus the food secure). One finding, which is consistent with the poverty rate being less tied to food insecurity is that those traditionally thought of as among the poor (i.e. female-headed households, African Americans, HS drop-outs, renters) are relatively less represented among the food insecure during the Great Recession. At the same time, the unemployed (especially the long-term unemployed) are relatively more represented, underlining the importance of increasing unemployment rates. Finally, we undertook a preliminary analysis of relative changes in nutritional behaviors, using the NHANES. Initial indications are that there was a relative increase in the use of fast food by the food insecure, with a concomitant decrease in important nutrients such as iron and fiber.

Future Work

While it is clear that the Great Recession has had significant impacts on food insecurity, it is important to explore the role of government policy in addressing it. According to data from the American Community Survey, 13.6 million households reported receiving SNAP benefits in 2010 (Loveless, 2011). This number implies that 11.9 percent of all households received SNAP, up 16 percent from the 10.3 reporting receipt in 2009.

Thus, SNAP participation was increasing at the same time that food insecurity increased, but the real question is whether SNAP participation and payments went up "enough" during the Great Recession to compensate for the increase in need. We saw, for example, that food insecurity appears to have leveled off after the initial spike up in 2008, but we do not know if SNAP was the key to stemming the increase.

While SNAP is the main food security program, government income support programs more generally may have an impact on food insecurity. A key shift in the lives of low-income families over the past two decades is the shift away from cash welfare benefits toward income supports that raise the payoff to employment. In the last decade, the Earned Income Tax Credit (EITC) has become the largest program transferring cash to low-income families in the United States (Bitler and Hoynes 2010, Burman and Kobes 2003), surpassing cash welfare benefits in the post-welfare reform period. However, if employment collapses, as it has in the Great Recession, then the EITC is unlikely to be effective at supporting low-income families (Bitler, Hoynes and Kuka 2012).

In order to more fully examine the role of government programs, we plan to merge the FSS supplement with the March Annual Demographic Survey. Given the four-months-on, eight-months-out, four-months-on rotation in the CPS, some rotation groups can be linked. For example, a group finishing up their first four months when the FSS is collected in December 2010 will be back on in March 2011 when retrospective information about all of 2010 will be collected. For these matched households, we will know not only their food security status, but also have full information on income and its sources, on in-kind benefits such as SNAP, school lunch and housing, and on tax expenditures (most importantly eligibility for the EITC). With detailed information on household income, we can start to

gain a fuller understanding of the income levels and program participation patterns among the food secure and insecure.

First, we can begin to explore what is causing the more aggregate effects documented above. For example, what role does an individual household's poverty status play (versus the national rate)? Are the ranks of the food insecure increasingly made up of those with just the characteristics of the traditional poor, or is food insecurity actually creeping up the income distribution? How has the relationship between income and program receipt varied over the Great Recession? These are the type of questions that can be addressed after merging the March supplement on to the FSS. More importantly, since program participation is a choice variable, with full income information, we can better simulate program eligibility, and focus on the effect of program eligibility, rather than simply receipt. That is, we can use expected eligibility as an instrument for program receipt in models estimating the impact of government programs on food insecurity.

We also plan to take advantage of changes in the EITC, which saw expansions for working families with three children as part of the 2009 stimulus. Using a difference-in-difference approach, we can see whether lower income families with three or more children see a smaller increase in food insecurity after the EITC expansions (compared to families with 2 or fewer children). Such a change in relative food security status could then be attributed to the EITC program. Similarly, we could explore the role of Social Security, where a regression discontinuity approach at eligibility age can be employed. Overall, having documented the extent to which food insecurity has been affected by the Great Recession, we are now poised to delve further and work to explore the role played by government policy. It is possible that government policy, in the form of programs such as

SNAP, may have ameliorated what may have been even larger increases in food insecurity. However, it is also possible that government policy, in its reliance on the EITC, may have contributed to a deterioration in food security when unemployment leapt up during the Great Recession. Our plan is to explore each of these different possibilities.

REFERENCES

Alaimo, K., C.M. Olson, E.A. Frongillo Jr., and R.R. Briefel, "Food Insufficiency, family income, and health in U.S. preschool and school-aged children," *American Journal of Public Health*, vol. 91, iss. 5, 2001.

Alaimo, Katherine, Christine M. Olson, and Edward A. Frongillo Jr., "Food Insufficiency and American School-Aged Children's Cognitive, Academic, and Psychosocial Development," *Journal of American Academy of Pediatrics*, vol. 108, no. 1, July 2001.

Almond, Douglas, Hilary Hoynes and Diane Whitmore Schanzenbach, "Inside the War on Poverty: The Impact of the Food Stamp Program on Birth Outcomes," *Review of Economics and Statistics*, May 2011.

Andrews, Margaret, Mark Nord, Gary Bickel, and Steven Carlson, "Household Food Security in the United States, 1999," FANRR-8, USDA, Economic Research Service, 2000. Available at: www.ers.usda.gov/publications/fanr8

Anderson, Patricia M., Kristin F. Butcher, and Phillip B. Levine, "Maternal Employment and Overweight Children," *Journal of Health Economics*, vol. 22, no. 3, May 2003, pp.477-504.

Anderson, Patricia M., Kristin F. Butcher, and Diane Whitmore Schanzenbach, "Childhood Disadvantage and Obesity: Is Nurture Trumping Nature?," in Jonathan Gruber (ed.), *An Economic Perspective on the Problems of Disadvantaged Youth*, Chicago University of Chicago Press, 2009.

Bhattacharya, Jayanta, Janet Currie, and Steven Haider, "Breakfast of Champions? The School Breakfast Program and the Nutrition of Children and Families," *Journal of Human Resources,* vol. 41, no. 3, pp. 445-466, 2006.

Bhattacharyaa, Jayanta, Janet Currie, and Steve Haider, "Poverty, food, insecurity, and nutritional outcomes in children and adults," *Journal of Health Economics*, vol. 23, iss. 4, pp. 839-862, July 2004.

Bickel, Gary, Mark Nord, Cristofer Price, William Hamilton, and John Cook (2000), "Guide to Measuring Household Food Security, Revised 2000," U.S. Department of Agriculture, Food, and Nutrition Service, Alexandria, VA.

Bitler, Marianne and Hilary Hoynes (2010). "The State of the Safety Net in the Welfare Reform Era," Brookings Papers on Economic Activity, Fall 2010, pp. 71-127.

Bitler, Marianne, Hilary Hoynes and Elira Kuka (2012). "Do In-Work Tax Credits Serve as a Safety Net?" UC Davis, mimeo.

Borjas, George J. "Food Insecurity and Public Assistance," *Journal of Public Economics*, vol. 88, no. 7-8, pp. 1421-1443, July 2004.

Burman, Leonard E., and Deborah I. Kobes, "EITC Reaches More Eligible Families than TANF, Food Stamps," Tax Notes, Tax Policy Center, March 17, 2003.

Casey, Patrick H., Kitty Szeto, Shelly Lensing, Margaret Bogle, and Judy Weber, "Children in Food-Insufficient, Low-Income Families," *Archives of Pediatrics & Adolescent Medicine*, vol. 155, no. 4, Apr 2001.

Cristofar, S, and P Basiotis, "Dietary Intakes and Selected Characteristics of Women Ages 19-50 Years and their Children Ages 1-5 Years by Reported Perception of Food Sufficiency," *Journal of Nutrition Education* 24:53-58, 1992.

DeLeire, Thomas, and Ariel Kalil, "How do Cohabiting Couples with Children Spend their Money?" *Journal of Marriage and Family,* vol. 67, no. 2, pp. 286-295, May 2005.

Dietz, William, "Does Hunger Cause Obesity?" *Pediatrics* 95(5): 766-767, May 1995.

Dinour, Laura M., Dara Bergen, Ming-Chin Yeh, "The Food Insecurity-Obesity Paradox: A Review of the Literature and the Role Food Stamps May Play," *Journal of the American Dietetic Association*, vol. 107, iss. 11, pp. 1952-1961. November 2007.

Gluckman, Peter, and Mark Hanson, *The Fetal Matrix: Evolution, Development and Disease.* Cambridge: Cambridge University Press, 2005.

Gundersen, Craig, "Measuring the Extent, Depth, and Severity of Food Insecurity: An Application to American Indians in the USA," *Journal of Population Economics*, vol. 32, no. 2, pp. 292-325, Jan 2008.

Gundersen, Craig, and Victor Oliveira, "The Food Stamp Program and Food Insufficiency," *American Journal of Agricultural Economics*, vol. 83, no. 4, pp. 875-887, Nov 2001.

Gundersen, Craig, and James Ziliak, "The Role of Food Stamps in Consumption Stabilization," *Journal of Human Resources,* vol. 38, pp. 1051-1079, 2003.

Guryan, Jonathan, Erik Hurst, and Melissa Kearney, "Parental Education and Parental Time with Children," *Journal of Economic Perspectives*, vol. 22, no. 3, Summer 2008.

Hoynes, Hilary, Diane Whitmore Schanzenbach and Douglas Almond, "Long Run Impacts of Childhood Access to the Safety Net," Mimeo, UC Davis, 2012.

Kaiser, Lucia L., and Marilyn Townsend, "Food Insecurity Among U.S. Children: Implications for Nutrition and Health," *Food Insecurity and Special Populations*, vol. 20, iss. 4, pp. 313-320, 2005.

Krueger, Alan B., and Andreas Mueller, "The Lot of the Unemployed: A Time Use Perspective," *Princeton University Industrial Relations Section* Working Paper, no. 524, May 2008.

Krueger, Alan B. & Andreas Mueller, "Job Search and Unemployment Insurance: New Evidence from Time Use Data," *Journal of Public Economics*, vol. 94, no. 3-4, pp. 298-307, 2010.

Levy, Helen and Thomas DeLeire, "What Do People Buy When They Don't Buy Health Insurance and What Does that Say about Why They Are Uninsured?" *Inquiry* 45(4): 365-379, Winter 2008/09.

Loveless, Tracy A., "Food Stamp/Supplemental Nutrition Assistance Program (SNAP) Receipt in the Past 12 Months for Households by State: 2009 and 2010." American Community Survey Briefs, November 2011. Available at: http://www.census.gov/prod/2011pubs/acsbr10-08.pdf

Martin, Katie S. and Ann M. Ferris, "Food Insecurity and Gender are Risk Factors for Obesity," Journal of Nutrition Education and Behavior, 39(1): 31-36, Jan-Feb 2007.

Nord, Mark, Margaret Andrews, and Steven Carlson, "Household Food Security in the United States, 2008," Economic Research Report number 83, Economic Research Service, USDA, November 2009.

Nord, Mark, Alisha Coleman-Jensen, Margaret Andrews, and Steven Carlson, "Household Food Security in the United States, 2009," ERR-108, Economic Research Service, USDA, 2010. Available at: http://www.ers.usda.gov/Publications/ERR108/ERR108.pdf

Ohls, James, Larry Radbill, and Allen Schirm, "Household Food Security in the United States, 1995-1997: Technical Issues and Statistical Report, prepared by Mathematica Policy Research, Inc., for USDA, Food and Nutrition Service, 2001. Available at: www.fns.usda.gov/oane/MENU/Published/FoodSecurity/FoodSecurityTech.pdf/

Rose, Donald, and J. Nicholas Bodor, "Household Food Insecurity and Overweight Status in Young School Children; Results From the Early Childhood Longitudinal Study," *American Academy of Pediatrics*, vol. 117, no. 2, pp. 464-473, Feb 2006.

Rose, D., and V. Oliveira, "Nutrient intakes of individuals from food-insufficient households in the United States," *American Journal of Public Health*, vol. 87, iss. 12, 1997.

Siefert, Kristine, Colleen M. Heflin, Mary E. Corcoran, and David R. Williams, "Food Insufficiency and Physical and Mental Health in a Longitudinal Survey of Welfare Recipients," *Journal of Health and Social Behavior*, vol. 45, no. 2, pp. 171-186, Jun 2004.

Wehler, Cheryl, Linda F. Weinreb, Nicholas Huntington, Richard Scott, David Hosmer, Kenneth Fletcher, Robert Goldbert, and Craig Gundersen, "Risk and Protective Factors for

Adult and Child Hunger Among Low-Income Housed and Homeless Female-Headed Families," *American Journal of Public Health*, Jan 2004.

Winicki, Joshua, and Kyle Jemison, "Food Insecurity and hunger in the Kindergarten Classroom: Its Effect on Learning and Growth," *Contemporary Economic Policy*, vol. 21, iss. 2, pp. 145-157, Apr. 2003.

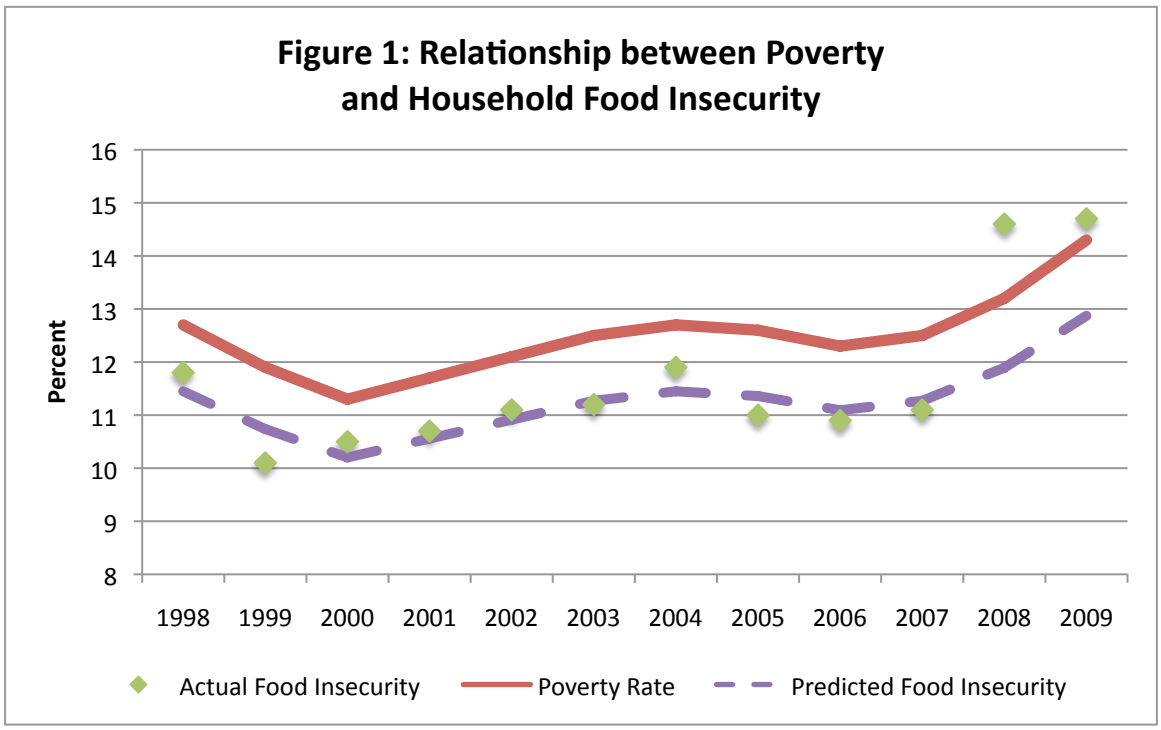

Figure 1: Relationship between Poverty and Household Food Insecurity
Percent
16
15
14
13
12
11
10
9
8
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Actual Food Insecurity
Poverty Rate
Predicted Food Insecurity

Figure 2a: Percent of Households Responding Affirmatively to Elements in Food Insecurity Battery: Adults, Higher Prevalence Items

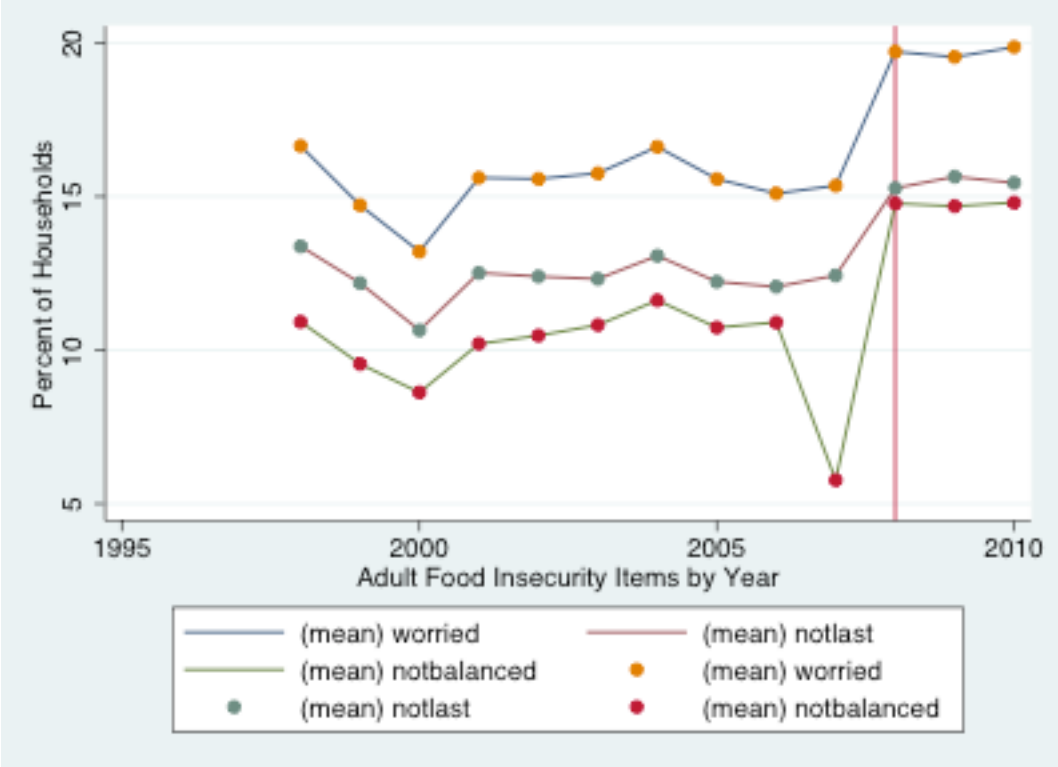


Figure 2b: Adults, Lower Prevalence Items

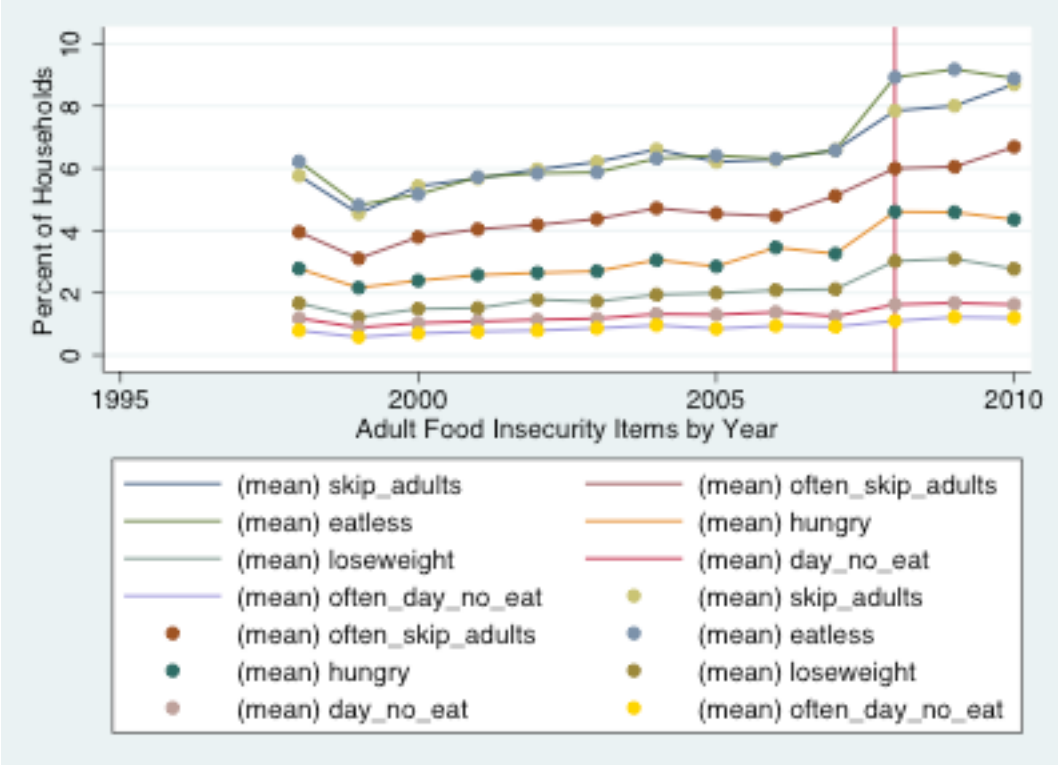


Figure 3a: Percent of Households Responding Affirmatively to Elements in Food Insecurity Battery: Children, Higher Prevalence Items

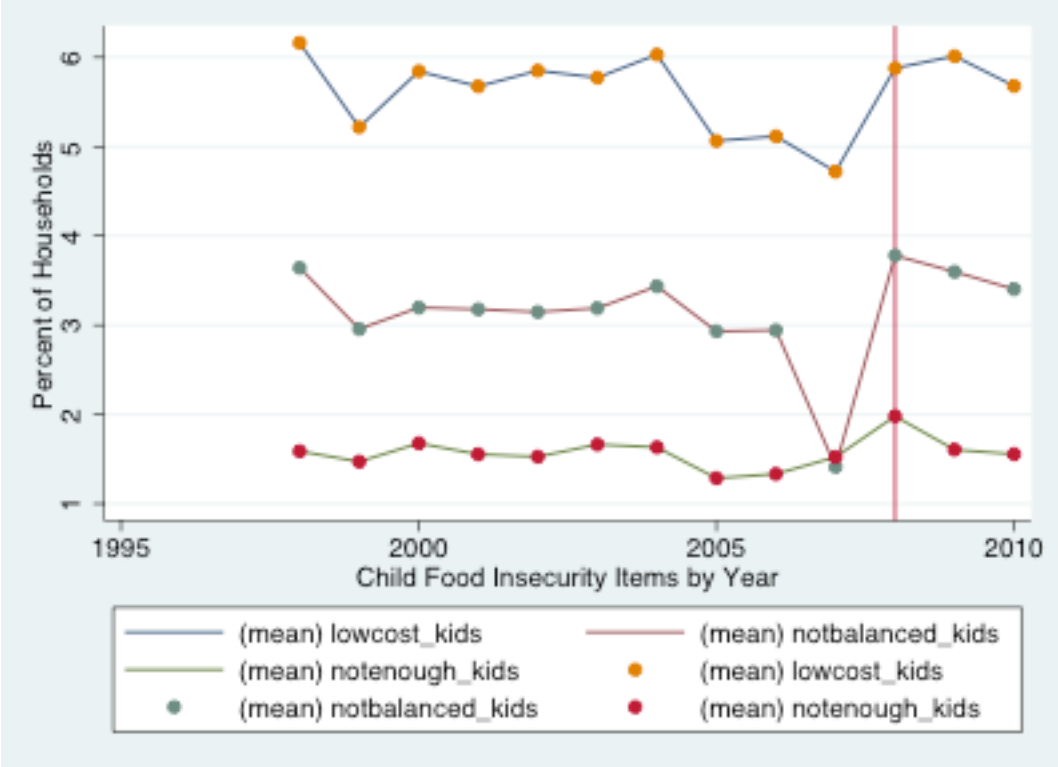


Figure 3b: Children, Lower Prevalence Items

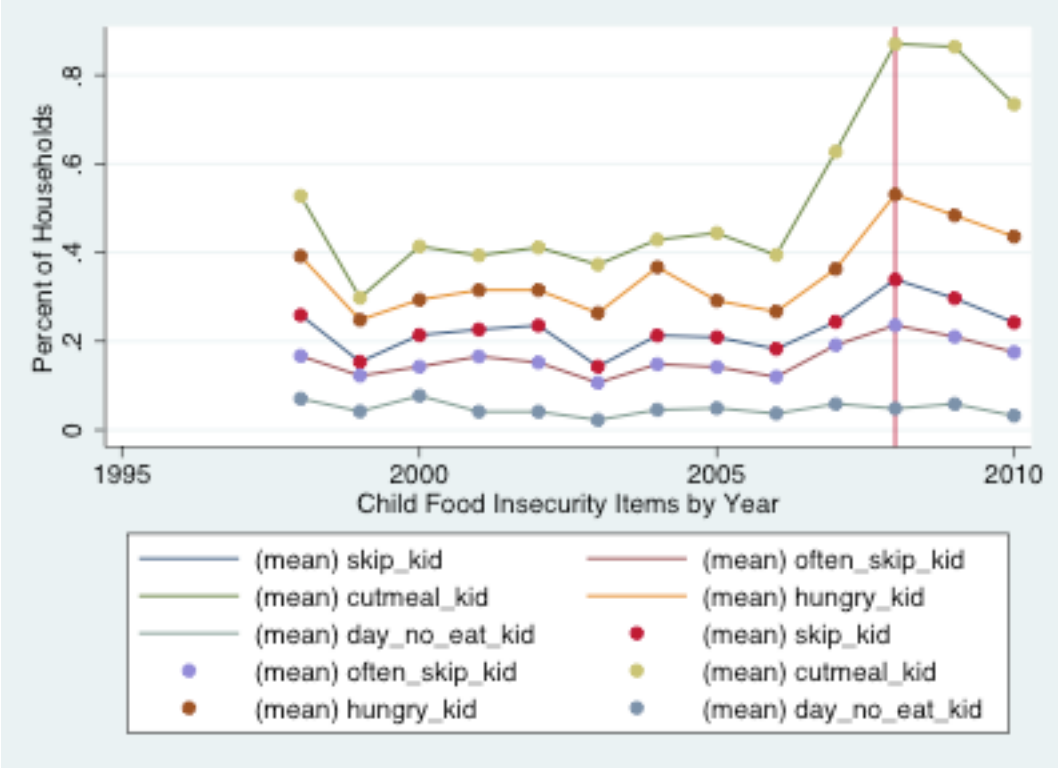
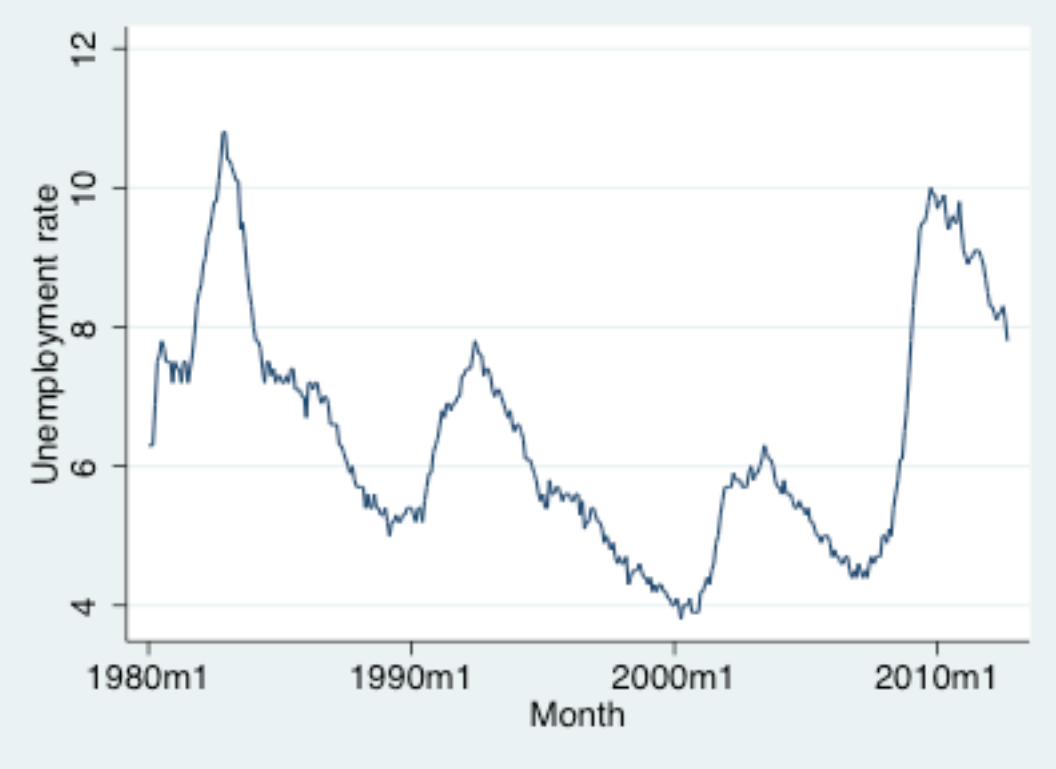


Figure 4a: Unemployment Rate



Source: Federal Reserve Economic Data (http://research.stlouisfed.org/fred2/)

Figure 4b: Median Duration of Unemployment

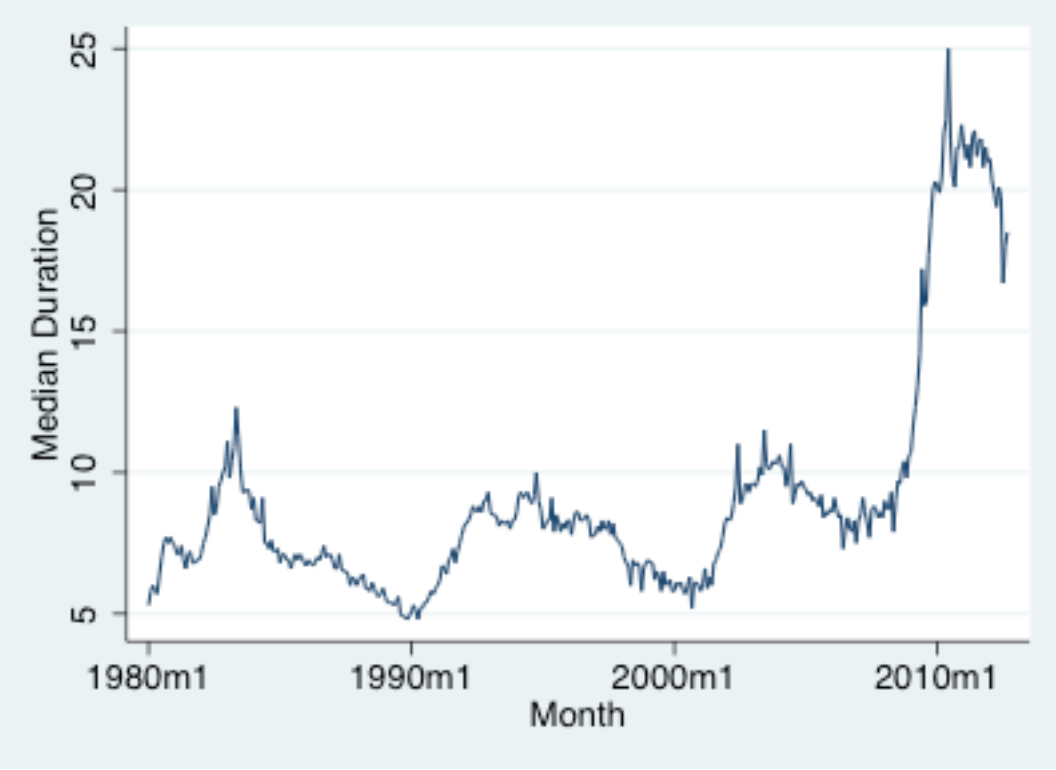


Figure 4c: Housing Prices

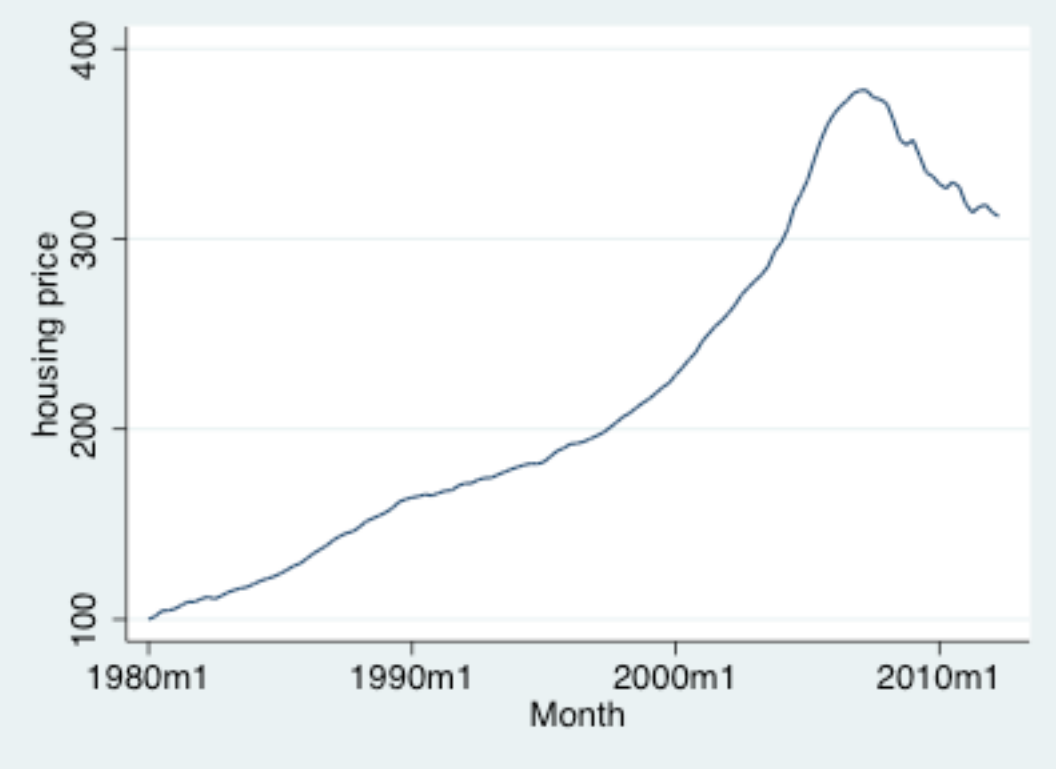


Figure 4d: CPI for Food Relative to Core CPI

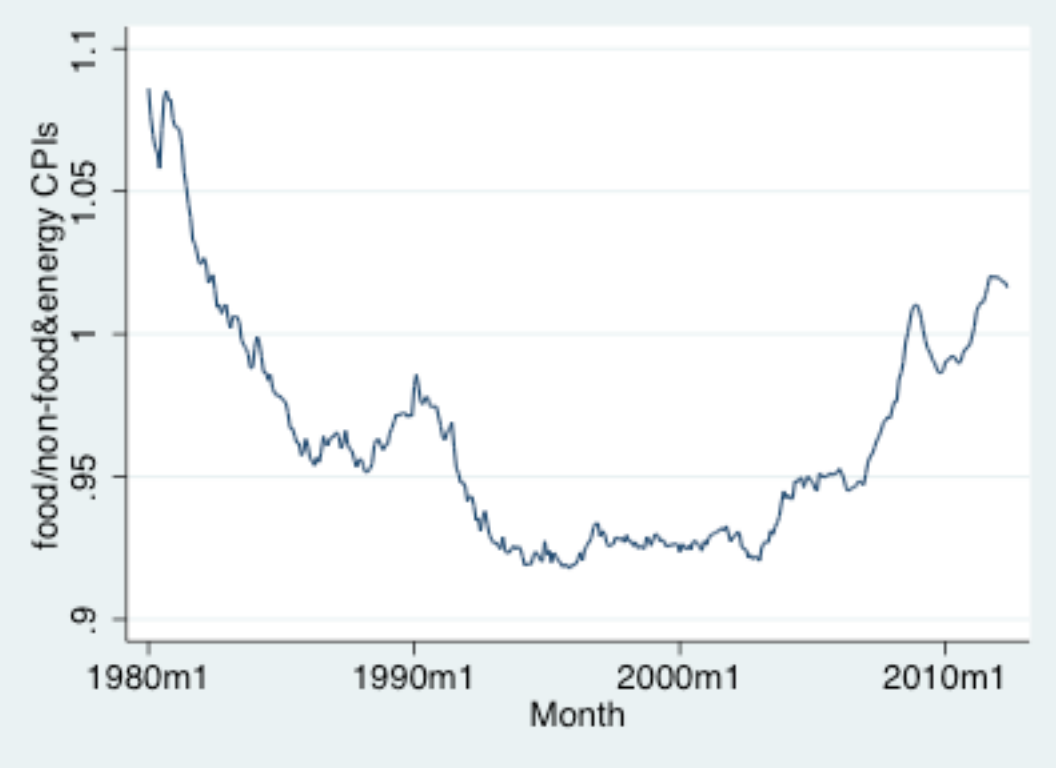


Figure 4e: Consumer Sentiment

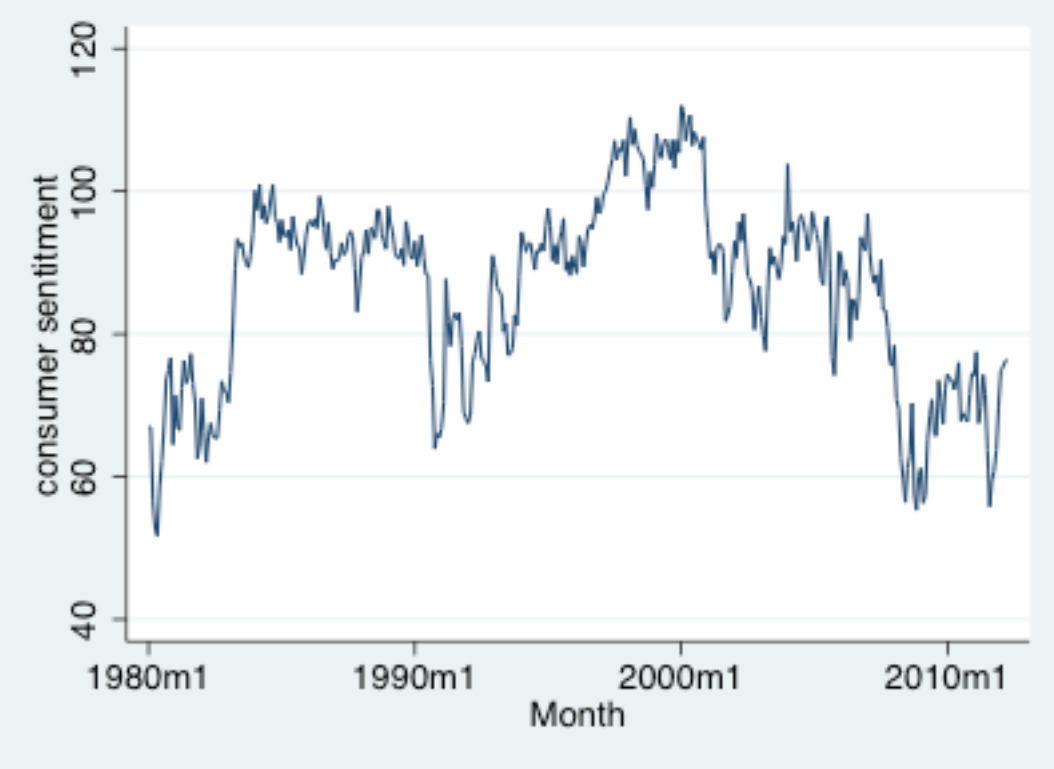


Table 1:

QUESTIONS INCLUDED IN THE FOOD SECURITY SCALE

Question Number*	Question
	Optional Preliminary Screen
Stage 1:	
Q2	Now I'm going to read you several statements that people have made about their food situation. Please tell me whether the statement was often, sometimes, or never true in the last 12 months. "I ***worried whether our food would run out*** before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
Q3	"The ***food that we bought just didn't last***, and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
Q4	"We ***couldn't afford to eat balanced meals.***" Was that often, sometimes, or never true for you in the last 12 months?
Q5**	"***We relied on only a few kinds of low-cost food to feed the children*** because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
Q6**	"We ***couldn't feed the children a balanced meal*** because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
	1st-Level Internal Screen
Stage 2:	
Q7**	"The ***children were not eating enough*** because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
Q8, Q8a	In the last 12 months, did ***you or other adults*** in your household ever ***cut the size of your meals or skip meals*** because there wasn't enough money for food? How often did this happen — almost every month, some months but not every month, or in only one or two months?
Q9	In the last 12 months, did you ever ***eat less than you felt you should*** because there wasn't enough money to buy food?
Q10	In the last 12 months, were you ever ***hungry but didn't eat*** because you couldn't afford enough food?
Q11	Sometimes people lose weight because they don't have enough to eat. In the last 12 months, did you ***lose weight*** because there wasn't enough food?

Table 1 continued:

QUESTIONS INCLUDED IN THE FOOD SECURITY SCALE

Question Number*	Question
	2nd-Level Internal Screen
Stage 3:	
Q12,	In the last 12 months, did ***you or other adults*** in your household ever ***not eat for a whole day*** because there wasn't enough money for food?
Q12a	How often did this happen — almost every month, some months but not every month, or in only one or two months?
Q13**	In the last 12 months, did you ever ***cut the size of any of the children's meals*** because there wasn't enough money for food?
Q14,**	In the last 12 months, did any of the ***children ever skip meals*** because there wasn't enough money for food?
Q14a**	How often did this happen — almost every month, some months but not every month, or in only one or two months?
Q15**	In the last 12 months, were the ***children ever hungry*** but you just couldn't afford more food?
Q16**	In the last 12 months, did any of the ***children ever not eat for a whole day*** because there wasn't enough money for food?

Source: Exhibit 2-2 in Bickel et. al. 2000, "Guide to Measuring Household Food Security"

Table 2: Estimating the Relationship between Food Insecurity and Aggregate Measures of Poverty and Unemployment (Clustered Standard Errors in Parentheses)

VARIABLES	(1) Food Insecure	(2) Residual from Col. 1	(3) Food Insecure	(4) Residual from Col. 3	(5) Food Insecure	(6) Residual from Col. 5
Percent in Poverty, US	0.0117				0.00347	
	(0.00164)				(0.00207)	
p-value	1.21e-05				0.119	
Indicator for Great Recession		0.0139		0.00560		0.00511
		(0.00660)		(0.00543)		(0.00584)
p-value		0.0564		0.323		0.399
Percent Unemployed, US			0.00770		0.00619	
			(0.000722)		(0.00134)	
p-value			1.76e-07		0.000589	
Constant	-0.0315	-0.00344	0.0733	-0.00138	0.0376	-0.00126
	(0.0195)	(0.00231)	(0.00423)	(0.00191)	(0.0212)	(0.00152)
p-value	0.133	0.162	7.46e-10	0.483	0.102	0.421
Observations	574,009	574,009	574,009	574,009	574,009	574,009
R-squared	0.001	0.000	0.002	0.000	0.002	0.000

VARIABLES	(7) Food Insecure	(8) Residual from Col. 7	(9) Food Insecure	(10) Residual from Col. 8
Percent in Poverty, US	0.00484		-0.00329	
	(0.00164)		(0.00208)	
p-value	0.0120		0.139	
Percent in Poverty, State	0.00677		0.00675	
	(0.00024)		(0.000244)	
p-value	0		0	
Indicator for Great Recession		0.0138		0.00509
		(0.00656)		(0.00582)
p-value		0.0565		0.399
Percent Unemployed, US			0.00613	
			(0.00134)	
p-value			0.000624	
Constant	-0.0304	-0.00342	0.0380	-0.00126
	(0.0192)	(0.00227)	(0.0212)	(0.00148)
	0.138	0.159	0.0976	0.412
Observations	574,009	574,009	574,009	574,009
R-squared	0.004	0.000	0.005	0.000

Notes: The data are from the CPS-FSS from 1998-2010. There is one observation per household and the regressions are weighted using the CPS household supplement weight.

Table 3: Estimating the Relationship between Adult High and Low Food Insecurity Items and Aggregate Measures of Poverty and Unemployment
(Clustered Standard Errors in Parentheses)

Panel 1: Worried that food would not last

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Worried	Residual from Col. 1	Worried	Residual from Col. 3	Worried	Residual from Col. 5
Percent in Poverty, US	0.0150				0.00505	
	(0.00201)				(0.00227)	
p-value	7.42e-06				0.0465	
Indicator for Great Recession		0.0155		0.00523		0.00454
		(0.00809)		(0.00720)		(0.00758)
p-value		0.0802		0.481		0.560
Percent Unemployed, US			0.00971		0.00752	
			(0.00126)		(0.00176)	
p-value			5.30e-06		0.00108	
Constant	-0.0295	-0.00370	0.107	-0.00125	0.0549	-0.00109
	(0.0249)	(0.00317)	(0.00762)	(0.00244)	(0.0227)	(0.00194)
p-value	0.260	0.265	8.29e-09	0.617	0.0327	0.586
Observations	592,358	592,358	592,358	592,358	592,358	592,358
R-squared	0.002	0.000	0.002	0.000	0.002	0.000

Panel 2: Often go a day without eating

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Often Day without Eating	Residual from Col. 1	Often Day without Eating	Residual from Col. 3	Often Day without Eating	Residual from Col. 5
Percent in Poverty, US	0.00152				0.000959	
	(0.000221)				(0.00023)	
p-value	1.74e-05				0.00148	
Indicator for Great Recession		0.000789		0.000309		0.000177
		(0.000626)		(0.000433)		(0.000522)
p-value		0.232		0.490		0.740
Percent Unemployed, US			0.000839		0.000422	
			(0.000101)		(0.00012)	
p-value			2.53e-06		0.00477	
Constant	-0.0105	-0.000189	0.00407	-7.38e-05	-0.00582	-4.24e-05
	(0.00283)	(0.000243)	(0.000817)	(0.000355)	(0.00268)	(0.000220)
p-value	0.00291	0.452	0.000318	0.839	0.0503	0.851
Observations	594,505	594,505	594,505	594,505	594,505	594,505
R-squared	0.000	0.000	0.000	0.000	0.000	0.000

Table 4: Estimating the Relationship between Children's High and Low Food Insecurity Items and Aggregate Measures of Poverty and Unemployment
(Clustered Standard Errors in Parentheses)

Panel 1: We relied on a few low-cost foods to feed the children….

Variables	(1) Low Cost Foods for Kids	(2) Residual from Col. 1	(3) Low Cost Foods for Kids	(4) Residual from Col. 3	(5) Low Cost Foods for Kids	(6) Residual from Col. 5
Percent in Poverty, US	-0.00013				-0.00292	
	(0.0007)				(0.00106)	
p-value	0.854				0.0173	
Indicator for Great Recession		0.00343		-2.52e-05		0.000375
		(0.00168)		(0.00175)		(0.00130)
p-value		0.0636		0.989		0.777
Percent Unemployed, US			0.000834		0.00210	
			(0.00044)		(0.000706)	
p-value			0.0847		0.0115	
Constant	0.0577	-0.000819	0.0512	6.02e-06	0.0813	-8.97e-05
	(0.0084)	(0.00148)	(0.00352)	(0.00146)	(0.00962)	(0.00128)
p-value	1.68e-05	0.590	5.62e-09	0.997	2.14e-06	0.945
Observations	593,144	593,144	593,144	593,144	593,144	593,144
R-squared	0.000	0.000	0.000	0.000	0.000	0.000

Panel 2: Children ever not eat for whole day because not enough money….

Variables	(1) Day w/o eating for Kids	(2) Residual from Col. 1	(3) Day w/o eating for Kids	(4) Residual from Col. 3	(5) Day w/o eating for Kids	(6) Residual from Col. 5
Percent in Poverty, US	-3.13e-05				-1.95e-05	
	(3.76e-05)				(4.96e-05)	
p-value	0.422				0.700	
Indicator for Great Recession		3.75e-05		4.77e-05		5.04e-05
		(7.55e-05)		(8.23e-05)		(7.80e-05)
p-value		0.628		0.573		0.531
Percent Unemployed, US			-1.73e-05		-8.84e-06	
			(2.43e-05)		(3.06e-05)	
p-value			0.489		0.778	
Constant	0.000881	-8.98e-06	0.000580	-1.14e-05	0.000781	-1.20e-05
	(0.00050)	(4.83e-05)	(0.00015)	(4.68e-05)	(0.000550)	(4.73e-05)
Obs.	594,381	594,381	594,381	594,381	594,381	594,381
R-squared	0.000	0.000	0.000	0.000	0.000	0.000

Table 5: Differences in Characteristics Among the
Food Secure and Insecure Before and During the Great Recession

	Food Secure		Food Insecure		Relative Change for FI	P-value for Relative Change
	Before GR	Great Recession	Before GR	Great Recession		
Female	0.510	0.50851	0.5305	0.51981	-0.00920	0.00222
Female Headed Household	0.198	0.198863	0.391	0.371963	-0.0199	0.00241
Female Headed Household w Kids	0.0849	0.08382	0.2839	0.25282	-0.0300	9.26e-05
Married	0.559	0.54961	0.378	0.37215	0.00354	0.274
Less than High School	0.182	0.156	0.379	0.3196	-0.0334	2.33e-05
High School Degree	0.301	0.2824	0.3284	0.3356	0.0258	3.30e-05
Some College	0.261	0.27069	0.2228	0.25629	0.0238	5.07e-05
College Plus	0.256	0.2908	0.07	0.0886	-0.0162	0.000406
African American	0.111	0.10931	0.245	0.21481	-0.0285	2.56e-06
Disabled	0.0359	0.03962	0.131	0.12432	-0.0104	0.00123
Own Home	0.753	0.74612	0.429	0.44752	0.0254	0.00596

Notes: Data are from the 1998 to 2010 CPS-FSS. Observations: 1,516,065

Table 6: Employment Outcomes Among the Food Secure and Food Insecure Before and During the Great Recession

	Food Secure		Food Insecure		Relative Change for FI	P-value for Relative Change
	Before GR	Great Recession	Before GR	Great Recession		
Employed	0.638	0.6038	0.52	0.48315	-0.00265	0.405
Unemployed	0.0265	0.0461	0.0847	0.1293	0.0250	0.000521
Not in Labor Force	0.336	0.3506	0.3959	0.3881	-0.0224	0.00234
Duration of Unemployment	0.415	1.243	1.521	3.904	1.555	0.00651
Discouraged Worker	0.00483	0.00727	0.01583	0.02004	0.00177	0.0172
Total Hours Worked Last Week	24.76	22.953	18.7	16.65	-0.243	0.102
Self Employed	0.0725	0.06924	0.0352	0.04424	0.0123	1.24e-06

Notes: Data are from the CPS-FSS 1998-2010. Observations: 1,191,368.

Table 7: Program Participation Among the Food Secure and Food Insecure Before and During the Great Recession

	Food Secure		Food Insecure		Relative Change for FI	P-value for Relative Change
	Before GR	Great Recession	Before GR	Great Recession		
Received SNAP in Last 30 Days	0.0300	0.0516	0.292	0.4386	0.125	0.00282
SNAP Amount in last 30 days	7.569	15.975	59.829	95.285	27.05	0.000198
Received WIC	0.0294	0.0349	0.1614	0.16499	-0.00191	0.615

Notes: Data are from CPS-FSS 1998-2010. Observations: 1,407,335

Table 8: Nutritional Differences for Food Secure and Insecure, before and during the Great Recession

	Food Secure		Food Insecure	Relative Change for FI		P-value for Relative Change
	Before GR	Great Recession	Before GR	Great Recession		
Number of Meals	3.864	4.322	3.69	4.0908	-0.0572	0.0901
Percent of Meals at Home	71.08	71.955	74.07	76.845	1.900	0.0449
Percent of Meals Fast Food	5.948	9.277	6.64	10.957	0.988	0.0749
BMI	26.11	26.487	25.725	26.0663	-0.0357	0.905
Calories	2,123	2026.79	2115.486	2003.186	-16.09	0.677
					Adults Only	
Protein (gm)	83.35	82.765	81.724	77.831	-3.308	0.113
Potassium (gm)	2,753	2674.55	2576.6	2404.74	-93.41	0.129
Calcium (mg)	893.5	945.57	836.98	856.13	-32.92	0.250
Phosphorus (mg)	1,341	1346.071	1296.85	1239.511	-62.41	0.0572
Iron (mg)	15.95	15.709	15.309	14.311	-0.757	0.0812
Fiber (gm)	15.83	16.327	15.047	14.556	-0.988	0.0471

Sources: NHANES 1999 to 2009. Observations : 46,363 overall, and 25,756 for adults