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Craig Gundersen
David C. Ribar

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Craig Gundersen

Iowa State University

David C. Ribar

*George Washington University
and IZA Bonn*

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
Email: iza@iza.org

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ABSTRACT

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This study uses data from the December 2003 Food Security Supplement of the CPS to compare the food insufficiency and insecurity measures with objective measures of food expenditures and objective and subjective measures of food needs. The study examines the general relationships between these variables and finds that reports of food hardships are positively associated with food expenditures and negatively associated with needs. The study goes on to examine reports of food hardships at low very levels of food expenditures, where we conjecture that most people should experience food problems. When expenditures are scaled by an objective measure of needs, there is no point along the expenditure distribution where more than half of the survey respondents report experiencing being food insufficient or insecure. However, when expenditures are scaled by a subjective threshold, we observe near-universal reporting of food problems at low levels of expenditures. The findings indicate that the food insufficiency and insecurity measures each incorporate a large subjective component, which limits the usefulness of the measures for comparing the extent of food hardships across populations or over time or evaluating the effects of assistance programs.

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Keywords: food insecurity, food insufficiency, expenditures, non-parametric regression

Corresponding author:

David C. Ribar
Department of Economics
The George Washington University
1922 F Street, NW
Washington, DC 20052
USA
Email: dcr7@gwu.edu

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1. Introduction

Measures describing food insecurity and food insufficiency are becoming an increasingly important tool for policymakers, advocacy groups, and researchers. Since 1995, Food Security Supplements have been regularly fielded as part of the Current Population Survey (CPS), and the U.S. Department of Agriculture has used these to calculate estimates of the prevalence of food problems. The most recent of these surveys, conducted in December 2003, indicated that nearly one in eight Americans were in households identified as food insecure (Nord et al. 2004). In addition to indicating the extent of food problems, the measures are used to gauge progress toward national objectives, such as the “Healthy People 2010” goals to reduce hunger, and evaluate the effectiveness of food assistance programs and other social supports (Wilde 2004). They have also been used by numerous scientists studying the antecedents and consequences of food hardships.¹

While the measures have enjoyed increased use, they have also become the focus of increased scrutiny, criticism, and, occasionally, skepticism. The National Research Council (NRC) is currently examining the food insufficiency measure and has issued a report questioning the thresholds that are used to identify different problems, the utility of the measure for evaluating food programs, and other aspects of the measure (NRC 2005). At base, the NRC is questioning exactly what the food insecurity measure captures. Along similar lines, some social scientists, including Hamermesh (2004), have expressed general skepticism regarding these and other self-reported well-being measures because of the subjective ways in which people may

¹ Recent examples include Bhattacharya et al. (2004), Borjas (2004), Dunifon and Kowaleski-Jones (2003), Evenson et al. (2002), Furness et al. (2004), Gundersen and Oliveira (2001), Gundersen et al. (2003), Kaiser et al. (2001), Mazur et al. (2003), Ribar and Hamrick (2003), Van Hook and Balistreri (forthcoming).

form their responses. While people's reports of food hardships may incorporate objective elements of well-being, they are also likely to reflect the respondent's subjective notions regarding appropriate food standards. In examining variation in the food problem measures across different people, regions or time periods, it is hard to disentangle the objective and subjective components—changes in the measures could reflect changes in food consumption, eating standards, or simple reporting behavior. Given the weight and importance ascribed to the food hardship measures it is necessary to ask: how closely are they associated with more objective measures of well-being?

Several incongruous empirical findings suggest that the subjective component may be substantial. One of the findings is the surprisingly high incidence of reported food problems at moderate and high levels of income (Nord and Brent 2002). Nord et al. (2004) estimate that in 2003, 28 percent of all food insecure households had incomes above 185 percent of the poverty line. To cite another example, while the average nutrient intakes of food insufficient households are below those of food sufficient households, the average intakes for food insufficient households are still more than 100 percent of the Recommended Daily Allowances for most nutrients (Rose and Oliveira 1997). Finally, there is the recent study by Bhattacharya et al. (2004) that found that children in poor, food insufficient households had nearly the same Healthy Eating Index values as children in more affluent, food sufficient households. The puzzling findings and other shortcomings in the measures have led Habicht et al. (2004), Johnson (2004), Wilde (2004) and others to exhort researchers to test the validity of the measures more rigorously.

We take up their challenge, using data from the December 2003 Food Security Supplement of the CPS to compare the one-question, 12-month food insufficiency measure; the

18-item, 12-month food insecurity measure; and the 12-item 30 day food insecurity measure with objective measures of food expenditures and objective and subjective measures of food needs. A contribution of our analysis is that it is framed in terms of a straightforward conceptual model of how people might logically compare objective information about food consumption with a possibly subjective assessment of needs to report food hardships. Our model generates the usual prediction that food consumption and food hardships should be negatively associated. However, it also predicts that absent a large subjective component, people with extremely low consumption levels should almost always report problems. When we compare reports of food problems from the CPS with reports of food expenditures scaled by an objective measure of needs, we find evidence for the first prediction but not the second. In particular, there is no point along the expenditure distribution where more than half of the survey respondents report experiencing being food insufficient or insecure. There are several alternative explanations for these results besides subjectivity, including an incorrect model or errors in the measures of expenditures and needs. To address these concerns, we re-run the analysis using the reports of food expenditures scaled by a subjective measure of needs. These results provide strong support for the conceptual model, leading us to conclude that there is a substantial subjective component in the food hardship measures. The subjective component greatly limits the usefulness of the food hardship measures in comparing the prevalence of actual problems across populations or over time and in evaluating the effectiveness of income and food expenditure supports.

2. Construction of the Food Insufficiency and Insecurity Measures

To gather information about whether Americans and especially low-income Americans obtain enough to eat, the USDA established the “food insufficiency question.” The question has appeared in numerous surveys since 1977 and is included in the CPS Food Security Supplement.

In the CPS, it asks people to think about food consumption and affordability in the previous 12 months and then respond to the statement “Which of these statements best describes the food eaten in your household

1. Enough of the kinds of food we want to eat,
2. Enough but not always the kinds of food we want to eat,
3. Sometimes not enough to eat, or
4. Often not enough to eat.”

The potential responses reflect increasingly severe conditions associated first with the adequacy and variety of the household’s diet and then with its levels of consumption. In December 2003, 78.7 percent of households reported having enough and the kinds of food they wanted to eat; 17.8 percent reported having enough but not the kinds of food they wanted to eat; 2.8 percent reported sometimes not having enough to eat, and 0.7 percent reported often not having enough to eat.²

In contrast to single-item food insufficiency measure, the 12-month food insecurity scale is constructed using responses from several questions: 18 if the household has children or 10 if it does not. Some of the conditions people are asked about include “I worried whether our food would run out before we got money to buy more,” (the least severe item), “Did you or the other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food,” “Were you ever hungry but did not eat because you couldn’t afford enough food,” and “Did a child in the household ever not eat for a full day because you couldn’t afford enough food” (the most severe item for households with children). The food insecurity scale is determined from the sum of the responses. Households that report two or fewer problems are classified as “food secure,” which is interpreted as having “assured access to

² All of the estimates that are reported in this study use sampling weights provided with the CPS.

enough food for an active, healthy life” (Hamilton et al. 1997, p. ii). Households with children that report three to seven problems are classified as “food insecure without hunger,” while childless households that report three to five problems are so classified. Food insecurity is interpreted as indicating limitations and uncertainty in obtaining appropriate amounts and kinds of food. Households with children that report more 8 or more problems (6 or more for households without children) are classified as “food insecure with hunger,” meaning that they are likely to have experienced the physiologic symptoms and discomfort associated with a lack of food. Although the food insufficiency and food insecurity scales have similarities, the latter addresses conditions of anxiety, differential experiences of children and adults, and occurrences of skipped meals and hunger that the food insufficiency question does not. From the December 2003 survey, 88.5 percent of households were categorized as food secure; 7.7 percent were food insecure without hunger; 3.5 percent were food insecure with hunger, and 0.3 percent did not provide enough data to make a classification.

Several of the food insecurity questions are followed by additional queries regarding whether the household experienced the same problem or condition in the past 30 days. Responses to 12 of these follow-up questions are used to calculate the “30-day food insecurity scale” (Nord 2002). While formally there are three categorizations—“food secure or food insecure at low level of severity, food insecure without hunger, and food insecure with hunger”—drawn from the 30-day scale, the regular USDA reports (e.g., Nord et al. 2004) focus on the extent of food insecurity with hunger. In principle, the shorter recall period for the 30-day scale should lead to more accurate responses. However, the use of the 12-month insecurity questions as screens means that reporting problems from these items will be transmitted to the

30-day measure. From the December 2003 survey, 2.6 percent of households were classified as being food insecure with hunger in the past 30 days.

3. Conceptual Measurement Model

Although the definition of food insecurity incorporates several concepts, Nord et al. (2004, p. 2) describe its most salient property as measuring “difficulty meeting food needs” stemming from “a lack of money or other resources to obtain food.” Habicht et al. (2004, p. 12) similarly summarize food insecurity as “a concept that refers to a lack of food.”³ The food insufficiency measure also clearly reflects a lack of types or amounts of food.

For our measurement model, we assume that this same general interpretation is at the root of how people answer questions regarding food hardships. Specifically, we assume that a person responds to these questions by comparing his or her household’s levels of food consumption, C_t , with assessments of the household’s food needs, N_t , at a series of time intervals, $t = 1, T$, over a given time period (one year or one month depending on the measure). The person perceives food problems as occurring in periods when food consumption falls below needs.

Although this model is very simple, it illustrates how people’s answers might combine objective and subjective components. The level of food consumption is an objective measure. However, the assessment of needs may depend on both objective components like family size and subjective components like food preferences.

Three primary implications emerge from our model. First, we expect that reports of food hardships should be negatively associated with food consumption. For our empirical analyses, we use weekly food expenditures as a measure of consumption. Expenditures are an imperfect

³ Although the first item in the food insecurity scale addresses anxiety, all of the subsequent questions ask about food purchases and intakes. To be defined as food insecure a household would have to respond affirmatively to at least one of these questions.

measure because a household's consumption will also vary depending on how much time it spends preparing or growing food, how much money it allocates to wasteful or luxury purchases, and how much food it receives from others. Nevertheless, we would still expect that food expenditures would be strongly associated with food hardships. Food expenditures are also relevant for policy purposes because food assistance programs operate through this dimension. Previous work using other measures of food consumption and caloric and nutrient intake could be resituated in the context of our model.

Second, our model implies that reports of food hardships should be positively associated with measures of food needs. Other things held constant, larger households and households with a higher proportion of adult members should have greater needs and report more problems than smaller households or households with a higher proportion of children. As an objective measure of food needs, we use the budget amounts from the Thrifty Food Plan (TFP), which vary depending on the size and age composition of the household. The TFP is the least expensive of several food plans that USDA created with minimum amounts of foods that would make up a nutritious diet; as such, it represents a very conservative estimate of food needs. In some analyses, we also examine a subjective measure of food needs that can be created from the Food Security Supplement; we discuss the construction of this measure in detail in the next section.

Previous validation studies have rarely moved beyond examining these two types of general associations in the variables. Our third implication departs from this previous work. If the minimum threshold is high enough so that it falls within the distribution of consumption levels, there will be a range of consumption levels in which everyone reports a problem. Allowing for errors in the reports of food hardships and food expenditures and allowing for some food consumption from sources other than expenditures, we still expect that there will be a

critical level of food expenditures below which most people should reasonably be expected to report food hardships.

4. Empirical Analysis

We begin our empirical analysis by investigating the first two implications of our measurement model: whether reports of food hardships decrease with food consumption and increase with food needs. Table 1 lists correlations between several indicators for food hardships and alternative measures of food expenditures and needs. These and our subsequent tables and figures are estimated using data from the December 2003 CPS Food Security Supplement. The top half of Table 1 reports statistics for the entire sample. The first column in lists sample means for the expenditure and need measures. The next three columns list correlations of expenditures and needs with a binary measure for sometimes or often having insufficient amounts of food, a binary measure for having insufficient amounts and kinds of food, and an ordered, categorical measure with the four possible responses to the 12-month food insufficiency question. The next two columns list correlations for a binary measure of food insecurity with or without hunger and an ordered, categorical measure with the three possible food insecurity outcomes from the 12-month scale, and the last two columns list correlations for the binary and ordered, categorical measures from the 30-day food insecurity scale.

The bottom half of the table reports the same statistics calculated for a restricted sample of households with incomes below approximately 185 percent of the poverty line. To reduce respondent burden, survey costs, and the number of erroneous reports, the CPS does not ask the food security questions of households that face little or no risk of food insecurity. In December 2003, the questions were only asked of households who reported (a) having incomes below 185 percent of the poverty line, (b) not having enough kinds or amounts of food in the food

insufficiency question, or (c) resorting to some strategy to stretch their food budgets. We examine outcomes among lower income households because, first and foremost, they are a policy-relevant and vulnerable group. However, the analysis of low-income households also serves a methodological purpose. The use of food insufficiency as one of the screening conditions for asking the food insecurity questions leads to an artificial correlation between these measures in the full sample. Because everyone in the low-income group was asked both sets of questions, we can more readily compare the results for this narrower sample.

The first row in each panel of Table 1 lists correlations of the food insufficiency and insecurity measures with the household's usual weekly food expenditures scaled by its needs as measured by the TFP. As expected, every one of the self-reported hardship measures is negatively correlated with usual food expenditures, although none of the correlations is especially strong. Despite using just a single question, the binary indicator for insufficient amounts and kinds of food and the four-category food insufficiency measure are more strongly associated with usual food expenditures than any of the food insecurity measures. Among the food insecurity measures, those from the 12-month scale are more strongly correlated with usual food expenditures than those from the 30-day scale. When the sample is restricted to poor households, the same pattern of results appears; the only difference is that the correlations are even weaker.

The second row of Table 1 lists correlations of the food hardship measures with the household's food expenditures from the previous week. It is hard to say a priori whether the correlations for the previous week's expenditures should be stronger or weaker than those for usual expenditures. On the one hand, respondents may be able to recall their food expenditures from the previous week more accurately than their usual expenditures, which would reduce

measurement error in this variable and contribute to stronger correlations. The measure of previous week's expenditures may also be more accurate because it is constructed from a series of questions that ask people about the places where they bought food and that ask them to distinguish between food and non-food purchases—usual expenditures are recorded in a single question. On the other hand, the previous week's expenditures may be less representative of expenditures over the previous year, which could weaken the correlations. The figures in the table indicate that the correlations for the previous week's expenditures are slightly weaker than for usual expenditures. This is true for all households and for low-income households. The pattern of correlations with the different food problem measures is similar to the pattern for usual expenditures.

So far, we have examined food expenditures scaled by an objective measure of needs. In the third row of each panel, we report statistics for food expenditures scaled by a subjective measure. In addition to the question about usual food expenditures, the CPS Food Security Supplement asks whether people would need to spend more than, less than, or the same as they usually do in order to just be able to meet their or their households' food needs. People who respond that they would need to spend a different amount are asked how much more or how much less they would have to spend. We construct a subjective threshold for food needs by taking the household's usual food expenditures and adjusting it up or down by the amount people say they would need to just meet their food needs. For people who indicate that they can meet their food needs by spending the same as they usually do, we use their usual food expenditures as the subjective standard.

For the full sample of households, the correlations between the food problem measures and subjectively-scaled expenditures are negative and generally stronger than the correlations

with the objectively-scaled measures. Unlike the results for the objectively-scaled measures, the correlations with the subjectively-scaled measures are stronger among low-income households than among the general sample of households. One possible explanation is that low-income households may have a better sense of what constitutes an acceptable threshold. This would be consistent with the work on subjective poverty thresholds where more weight is placed on the responses of those lower in the income spectrum when constructing thresholds (see, e.g., Kapteyn et al. 1988).

The final two measures that we examine in Table 1 are the TFP and subjective measures of food needs—the denominators from our first three measures. As expected, the TFP values are positively correlated with the 12-month food insufficiency and insecurity measures. However, they are weakly, negatively correlated with the 30-day food insecurity measure. The subjective food needs threshold is positively correlated with all of the food problem measures. The correlations for both the TFP and subjective thresholds are stronger among the restricted sample of low-income households than among the general sample of households.

In general, the directions of the relationships between the food hardship measures and the expenditure and needs measures are consistent with our expectations. The magnitudes of the relationships, however, are surprisingly modest. We are also a little surprised that the one-question food insufficiency scale is about as strongly correlated with the expenditure and needs measures as the multi-question food insecurity scale and that both of these 12-month measures are more strongly related to expenditures and needs than the 30-day food insecurity scale. Because the 12-month insecurity scale is partially conditioned on the insufficiency question and the 30-day insecurity scale is conditioned on the 12-month questions, we expected to find the opposite pattern.

Our analysis of Table 1 is similar to previous analyses that have mainly examined raw or partial associations between hardships and other measures. In Table 2, we turn to the more novel implication from our measurement model—that households with very low food intakes should almost always report food hardships. Table 2 lists the proportion of households with different characteristics that report having insufficient amounts of food (column 1), having insufficient amounts or kinds of food (column 2), being food insecure in the last 12 months (column 3), and being food insecure in the last 30 days (column 4). As before, results are reported for the full sample of households (top panel) and a subsample of low-income households.

The first rows in the top and bottom panels list the proportions of each sample reporting different problems. The statistics confirm previous findings that low-income households are substantially more likely to report food hardships than other households. For three of the four measures, the incidence of food hardships is more than twice as high among low-income households than among the general set of households. This is not surprising insofar as we would expect a higher incidence of food problems among poor and near-poor households due to (a) lower resources available for food purchases and (b) the use of income as a screening factor for asking the food insecurity questions. Just under 40 percent of low-income households report problems obtaining the amounts or kinds of food that they want, and only about a quarter report being food insecure at any point during the previous year. Fewer than 10 percent report being food insecure with hunger over the last 30 days or having insufficient amounts of food.

The next three rows in each panel list the incidence of food hardships among households whose food expenditures fall below certain thresholds. As our first indicator, we consider households whose usual weekly expenditures are less than half of the TFP—about \$38 on average in our sample. Because the TFP itself represents a low-end estimate of the minimum

amount needed to purchase a nutritious diet, we would expect to see many reports of hardships among households whose usual expenditures fall substantially short of this mark. The estimates from Table 2 reveal, however, that this is not the case. To be sure, the proportions of households with hardships are higher in the second row of each panel than the first. However, none of these proportions reaches 50 percent. For instance, only about a third of low-income households with usual food expenditures below half the TFP report being food insecure. The incidence of food hardships is slightly lower when we apply this same threshold to the previous week's expenditures. We conjecture that weekly expenditures may be highly variable for some families and that expenditures for a given week may not be a good indicator of long-term consumption patterns. Regardless of which expenditure measure is used, the incidence of food problems at these miserly levels of expenditure strikes us as being astonishingly low.

When a subjective rather than an objective threshold is employed, the proportion of households classified with food hardships increases dramatically. For the general income sample, the incidence of each type of hardship more than doubles. For example, about two-thirds of households with subjectively low usual expenditures report having insufficient amounts or kinds of food, and about half of the households report being food insecure over the past year. Among the low-income sample, the incidence of problems is even higher: 76 percent report having insufficient amounts and kinds of food, while 60 percent report being food insecure over the past year. These results, which indicate that people's reports of food hardships are consistent with their responses regarding expenditure thresholds, support our measurement model. They also indicate that the expenditure reports are not wildly off the mark.

Our measurement model implies that food problems should be reported when consumption falls below some threshold, but it does not specify where the threshold should be.

Although the thresholds in Table 2 are reasonably stringent, there are many other points that could be considered. One way to show the robustness of our results to different thresholds is to calculate the incidence of food hardships at every point along the expenditure distribution. We do this by estimating non-parametric regressions of the food problem measures on the expenditure measures.

Figure 1 displays results from non-parametric regressions that use each of the binary indicators from Table 2—insufficient amounts and kinds of food, insufficient amounts of food, food insecurity from the 12-month scale, and food insecurity from the 30-day scale—as dependent variables and usual expenditures scaled by the TFP as an explanatory variable.⁴ The figure displays results for the entire sample of households (dark lines) and for the restricted sample of low-income households (light lines). All of the regressions exclude a small number of observations that reported having no usual food expenditures.⁵ For the low-income sample, they also omit a few observations with food expenditures that are more than four times the TFP.

The figure provides a more complete picture of the relationships between reported food hardships and expenditures than the table. Several features are consistent with our earlier descriptive results. Although the incidence levels differ across hardship measures, the pattern of results is very similar. Low-income households are more likely to be classified as having a food hardship than other households at all levels of food expenditures. For both the low-income and general samples, food hardships generally decline with expenditures, except at the very lowest levels of expenditures. The initially increasing incidence of some types of food hardships across the lowest levels of expenditures casts a little doubt on the reliability of expenditures as an

⁴ For Figures 1 and 2, we used a bandwidth of 0.2 and for Figure 3 we used a bandwidth of 0.65.

⁵ The households reporting no usual expenditures were dropped because of the obvious inconsistency with food consumption. The incidence of hardships among these households was slightly lower than the incidence among households with small positive expenditures.

indicator of food consumption, at least for these levels of reported food expenditures. In line with the findings from Table 2, we never observe near-universal reporting of food hardships at any point along the expenditure distribution when the TFP is used as a scaling variable. With this scaling, the highest incidence of food hardships occurs near the 50 percent threshold, where roughly half of the low-income households report having insufficient amounts and kinds of food and about 40 percent report being food insecure.

Figure 2 displays results of non-parametric regressions with the same dependent variables run against the previous week's expenditures scaled by the TFP. The results are very similar to the results from Figure 1 with two exceptions: the incidence of food hardships declines across the entire range of expenditures in the new graphs, and the maximum incidence of food hardships is slightly higher when we look at distributions based on the previous week's expenditures.

Figure 3 shows the results of non-parametric regressions run using usual weekly expenditures scaled by the subjective threshold. The estimates fit the pattern predicted by our measurement model—there is near-universal reporting of food hardships at the lowest levels of expenditures, and hardships subsequently decline with expenditures. Another interesting feature of the graphs is that the reporting behavior of low-income households is almost identical to that of the general set of households when expenditures are below the subjective threshold.

5. Discussion

Our empirical analysis carefully examines the relationship between self-reported food insecurity and insufficiency measures and several measures of expenditures and needs. Unlike previous validation studies, our analysis is framed in the context of a measurement model. The

model generates the standard predictions that self-reports of food hardships should be negatively associated with food consumption and positively associated with food needs. However, it also predicts that reported problems should be nearly universal once food consumption falls below a threshold level. The model motivates an analysis of the incidence of food problems at different consumption levels but especially at the low end of the distribution. It also indicates ways in which people might combine objective and subjective elements in answering questions about food hardships.

Consistent with previous research finding evidence that food hardships have some basis in objective, material circumstances, we find that food insecurity and insufficiency are associated with incomes, expenditures and needs in the expected directions. Of more concern, however, are our results indicating that the correlations between the self-reported hardship measures and the objective measures are weak and that the prevalence of hardships among households with low levels of income and food expenditures is low. The strongest correlation that we are able to estimate is a coefficient of -0.143 between a household's usual weekly expenditures scaled by the TFP and a binary indicator from the single-item food insufficiency scale. The highest incidence of food hardships, at least when arrayed along an objectively scaled measure of expenditures, is just under 60 percent, which only occurs among low-income households. When we consider households at all income levels, the incidence of food problems never rises much above 40 percent.

There are several potential explanations for these results. The first is that our measurement model, which assumes that reported hardships stem from a single, underlying index (the ratio of food consumption to food needs), might be incorrect. Our model emphasizes limitations in the quantity of food, but the food hardship measures may also tap into anxieties

about the availability of food, concerns about the quality of food, behaviors for protecting vulnerable household members, and other factors. Indeed, Frongillo (1999) and others have found that items in the food insecurity measure capture these constructs, and the NRC (2005) has questioned whether food insecurity is uni-dimensional. While we do not dispute these other findings, the very strong association between food hardships and subjective assessments of the expenditures required to meet food needs suggests that the quantity of food is a central concern for respondents and that our model is valid.

A second potential explanation is that the food insecurity and insufficiency measures may include a lot of recall error or other types of random, response error. Random variation would weaken the correlations between these and other measures. It does not seem, however, as though measurement error is a major culprit in the pattern of results. For one thing, the incidence of hardships is fairly low. Because of the boundary condition, response errors would tend to inflate the measured incidence of hardships rather than diminish it. Also, the answers to the food insecurity items mostly follow expected severity patterns and are correlated with other subjective measures. Thus, the hardship measures appear to be internally valid.

A third and similar explanation is that the food expenditure measures are noisy or at least not especially good indicators of food consumption. Concerns about the quality of the expenditure measures go to the heart of our analysis, because we rely on them to validate the reports of hardships. Some patterns in the results, such as the households that report zero usual food expenditures and the initially rising incidence of food hardships at very low levels of usual expenditures, suggest that there may be some reporting deficiencies. Despite these problems, we are confident that expenditures are reasonably measured. The expenditure questions are preceded by several other questions that prompt respondents to consider various aspects of their

food spending. Individual reports of usual and previous week's expenditures are highly correlated. Finally, when they are scaled by the subjective threshold, expenditures are strongly correlated with reported food problems.

This leaves us with the last, and we believe, most plausible explanation, which is that the reports of food problems contain a large subjective component. The weak correlations with the objective measures coupled with the strong correlations with the partially subjective measures point us toward this conclusion.

The results indicate that the skepticism expressed by some social scientists about the objectivity of food hardship measures is well-placed. The food insecurity and insufficiency measures do not just reflect low levels of food consumption but also high and, arguably, subjective standards of food needs. These findings will be disquieting to policymakers. The weak relationship with objective consumption and needs data implies that the food insecurity and insufficiency measures will have difficulty registering effects from our primary policy tools for addressing food hardships—income and expenditure supports. They may also have difficulty registering impacts from more general economic improvements.

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Table 1. Correlation between food insufficiency and insecurity measures and food expenditure and needs measures

Measure	(Mean)	Food insufficiency			Food insecurity – 12 mos. scale	Food insecurity – 30 day scale		
		Insufficient amounts	Insufficient amounts and kinds	4-category indicator	Food insecure	3-category indicator	Food insecure with hunger	3-category indicator
<i>All households</i>								
Ratio of usual weekly food expenditures to TFP	(1.46)	-0.071	-0.143	-0.138	-0.120	-0.074	-0.060	-0.034
Ratio of previous week's food expenditures to TFP	(1.62)	-0.063	-0.122	-0.117	-0.102	-0.037	-0.048	-0.003
Ratio usual weekly food expend. to subj. threshold	(1.16)	-0.116	-0.135	-0.152	-0.149	-0.115	-0.106	-0.073
Weekly food needs – Thrifty Food Plan	(75.10)	0.013	0.066	0.052	0.074	0.015	-0.015	-0.015
Subjective threshold for food needs	(96.16)	0.054	0.034	0.047	0.071	0.048	0.035	0.027
<i>Households with Income Less than 185 Percent of the Poverty Line</i>								
Ratio of usual weekly food expenditures to TFP	(1.13)	-0.043	-0.070	-0.073	-0.069	-0.044	-0.028	-0.016
Ratio of previous week's food expenditures to TFP	(1.22)	-0.041	-0.056	-0.062	-0.044	-0.006	-0.022	0.012
Ratio usual weekly food expend. to subj. threshold	(1.02)	-0.146	-0.149	-0.178	-0.169	-0.147	-0.138	-0.105
Weekly food needs – Thrifty Food Plan	(76.87)	0.016	0.090	0.065	0.107	0.030	-0.019	-0.015
Subjective threshold for food needs	(89.31)	0.111	0.141	0.149	0.161	0.112	0.085	0.070

Note: Statistics calculated using weighted data from December 2003 CPS Food Security Supplement for non-institutionalized single-adult and single-family households living in the 48 contiguous states.

Table 2. Proportion of households in different conditions reporting food insufficiency and insecurity

Condition	Insufficient amounts of food	Insufficient amounts and kinds of food	Food insecure – 12 month scale	Food insecure with hunger – 30 day scale
<i>All households</i>				
All households	0.035	0.213	0.112	0.026
Usual weekly food expenditures below ½ TFP	0.091	0.336	0.228	0.069
Previous week's food expenditures below ½ TFP	0.061	0.273	0.162	0.042
Usual expenditures below subjective threshold	0.207	0.673	0.495	0.158
<i>Households with Income Less than 185 Percent of the Poverty Line</i>				
All poor households	0.085	0.398	0.265	0.064
Usual weekly food expenditures below ½ TFP	0.139	0.467	0.353	0.100
Previous week's food expenditures below ½ TFP	0.113	0.460	0.321	0.087
Usual expenditures below subjective threshold	0.254	0.759	0.607	0.198

Note: Statistics calculated using weighted data from December 2003 CPS Food Security Supplement for non-institutionalized single-adult and single-family households living in the 48 contiguous states.

Figure 1. Non-parametric regression estimates of the relationship between food hardships and usual weekly food expenditures scaled by the TFP

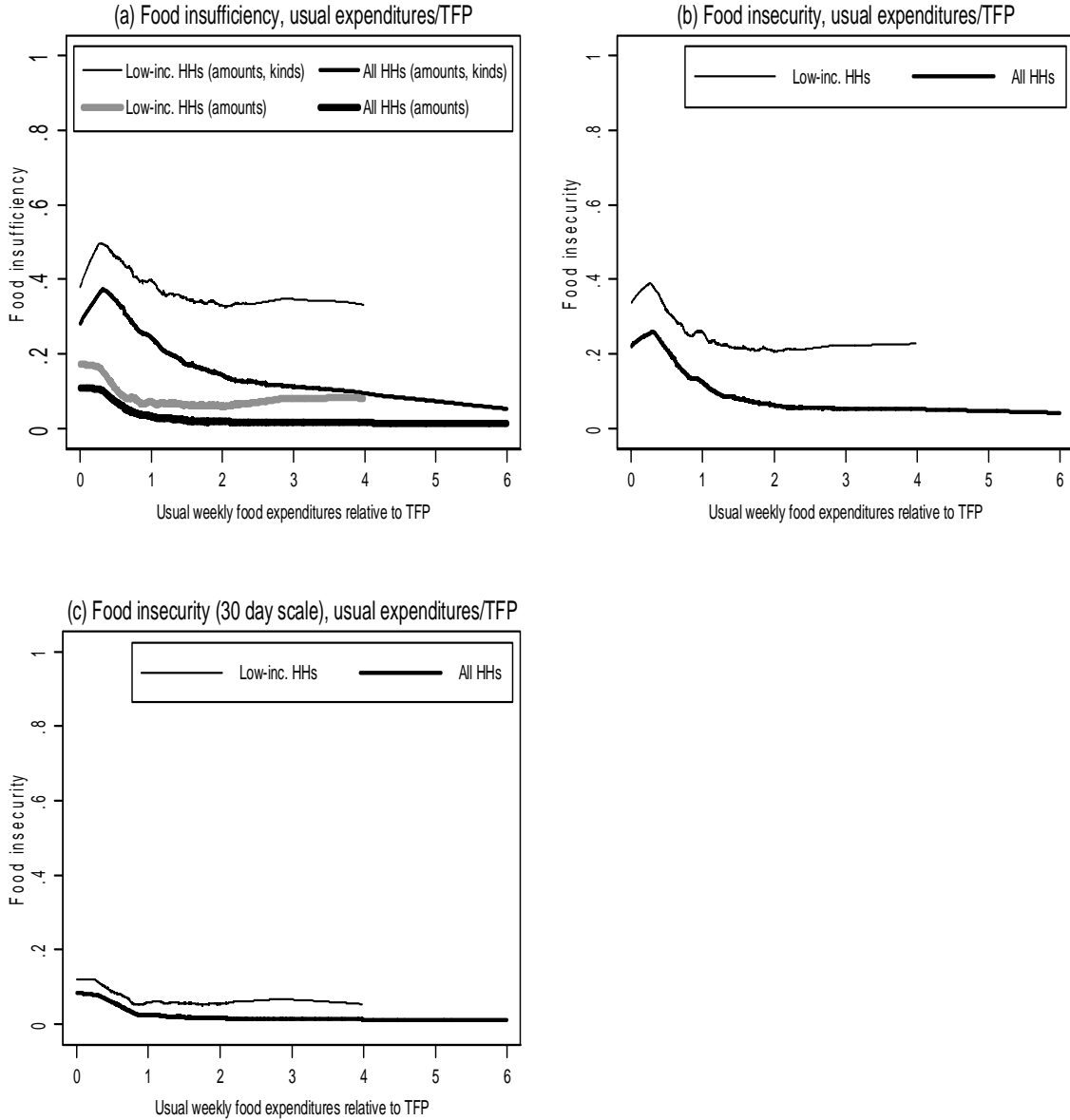


Figure 2. Non-parametric regression estimates of the relationship between food hardships and previous week's food expenditures scaled by the TFP

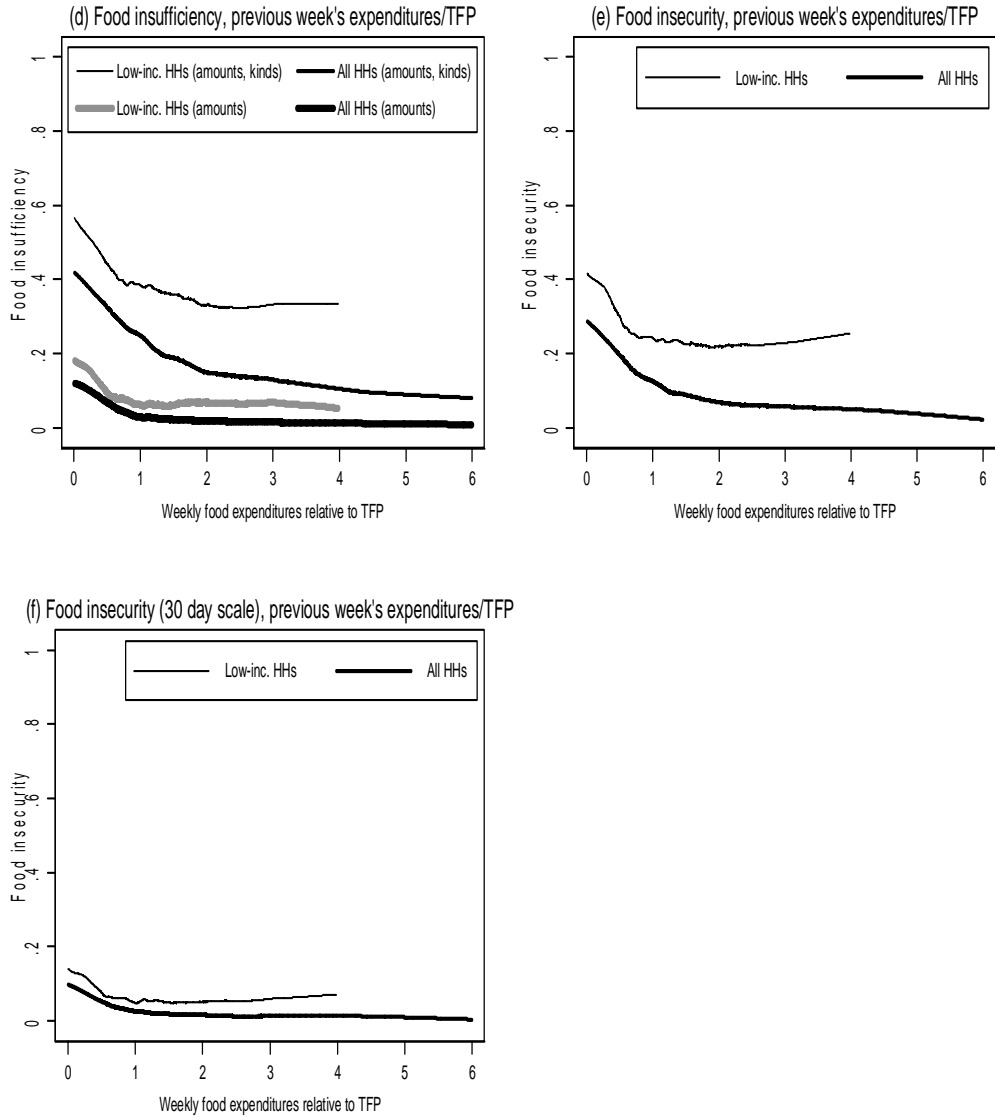


Figure 3. Non-parametric regression estimates of the relationship between food hardships and usual weekly food expenditures scaled by a subjective threshold

