

Changes in Food Security after Welfare Reform: Can We Identify a Policy Effect?

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Abstract

We investigate whether welfare reform, broadly defined to include the Earned Income Tax Credit (EITC), has altered single mothers' standard of living relative to that of married mothers. We focus on changes in food-related problems, using data collected in the annual Food Security Supplement (FSS) to the Current Population Survey between 1995 and 1999. We examine about fifty food-related problems. All these problems declined between 1995 and 1999 among both single and married mothers. Proportional declines were approximately equal for the two groups. Single mothers started with more food-related problems than married mothers, so equal proportional declines led to larger percentage point declines among single mothers. Multivariate analysis shows that single mothers and married mothers both saw improvements from 1995 to 1997 and that problems declined among single mothers at least as much as among married mothers. After 1997, improvements appear to cease among both groups. But because the US Department of Agriculture's recent report on its September 2000 survey shows significant improvement among female-headed households between 1998 and 2000, the absence of measurable progress between 1997 and 1999 may well be due to random sampling error or some other methodological artifact.

If one believes that prosperity would have reduced food-related problems by the same proportion among single mothers as among married couples with children even in the absence of welfare reform and the Earned Income Tax Credit, our findings imply that welfare reform per se had no effect on single mothers' living standards. If one believes that prosperity would ordinarily have helped families with high labor force participation rates more than families with low labor force participation rates, then the fact that food-related problems fell by the same proportion among single mothers as among married mothers implies that single mothers did better under welfare reform and the EITC than they would have done in its absence.

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The most recent wave of welfare reform began in 1993 when the Clinton Administration began allowing states to give welfare recipients more incentives to seek work. In 1996 President Clinton signed the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), which initiated even more dramatic changes in federal and state welfare policies. The welfare rolls have fallen by roughly half since 1994, but evaluating the impact of this decline on single mothers' material well-being is not easy.

The first problem is that welfare receipt declined for at least three reasons: changes in the welfare system itself, improvements in the labor market, and increases in the Earned Income Tax Credit (EITC). The welfare system and the labor market changed continuously from 1994 to 1999. The EITC was fully phased in by 1996, but awareness of its benefits probably continued to spread for some time after that. "Welfare reform" is therefore a gradually intensifying process, not a single event.

A second problem is specifying what would have happened in the absence of welfare reform. A number of studies have tried to track families that left the rolls. These studies face many technical challenges: response rates are low, and one would expect the families experiencing the greatest difficulties to be especially hard to find. But an even more fundamental difficulty with concentrating on those who leave welfare is that it relies on an implausible counterfactual, namely that in the absence of welfare reform all these families would have remained on the rolls. Even in the 1980s roughly half the families on the rolls in a given year had usually left within five years (Committee on Ways and Means, 2000, p. 447). In the 1980s these leavers were replaced by other families with similar characteristics. After 1994 many were not replaced. It follows that the welfare rolls have declined not just because more families are leaving the rolls but because fewer families are being added. Because we cannot identify families that would now be getting welfare if the rules had not changed, we cannot determine how welfare reform affected these families' material well-being.

One way to solve the problems posed by low response rates in surveys of welfare leavers and inability to identify non-entrants is to look at aggregate changes in the well-being of *all* single mothers, regardless of whether they receive welfare. Several studies have done this using income data from the March Current Population Survey (Primus, 1999; Jencks and Swingle, 2000). While these studies are instructive, they could also be deceptive. Working is likely to increase a single mother's income, but it is also likely to increase her expenses, since a working mother is likely to spend more on childcare, transportation, clothes, and medical care (because she usually loses her Medicaid coverage). The amount of additional income that a single mother needs to maintain a constant standard of living when she moves from welfare to regular employment depends on her circumstances, so no uniform adjustment is likely to give us an accurate picture of how living standards have really changed. In addition, Edin and Lein (1997) showed that many AFDC recipients made ends meet by supplementing their welfare checks with unreported income from off-the-books jobs, family members, and boyfriends. Taking a regular job is likely to reduce this kind of unreported income as well as increasing a mother's expenses. For all these reasons taking low-wage jobs could increase single mothers' money income more than it increases their material standard of living. Indeed, an increase in money income could be accompanied by a decline in material well-being.

One way to determine whether this happened is to look directly at changes in single mothers' material standard of living rather than looking only at their reported income. This paper does this by using the Current Population Survey's Food Security Supplement (FSS) to measure changes in the adequacy of single mothers' food supply.¹ The Current Population Survey has administered the FSS for the US Department of Agriculture (USDA) every year since 1995. The data collected in 2000 were not yet available when we did the analysis, so we focus on trends from 1995 through 1999. The FSS asks households about their experiences during the twelve months prior to the survey, so our data describe households' experiences between April 1994 and April 1999.

In an effort to distinguish the effects of a tighter labor market from the effects of welfare reform we compare trends among single mothers with trends among married

¹ For a somewhat similar analysis that focuses on food expenditures see Meyer and Sullivan (2000).

couples with children, who were probably not much affected by welfare reform.² This comparison does not resolve uncertainty about what would have happened to single mothers in the absence of welfare reform. We return to that issue later.

Our terminology also requires some explanation. USDA describes the FSS as measuring food “security” or “insecurity.” The term “food security” was invented because far more families worry about not getting enough to eat than actually go without food. But while USDA’s measure of food security includes questions about whether respondents had such worries, USDA sets the cut point for labeling a family as “insecure” so that no family can be classified as such unless it reported at least one deficiency in what its members ate. Such a cut point makes sense from a policy viewpoint, but using the term “insecure” to describe families that report deficiencies in what they actually ate seems to us misleading. Our solution has been to use USDA’s terminology when we use USDA’s measures. When we construct our own measures, however, we refer to “food-related problems” rather than food security or insecurity. Following Census Bureau practice we restrict the term “children” to individuals under the age of eighteen.

Data.

The FSS asks respondents about a wide range of food-related problems, including worries about their household's food supply, perceived dietary inadequacy, reduced food intake, and hunger. The FSS also asks respondents about their strategies for coping with food insufficiency, their levels of food expenditure, and the extent to which they rely on

² Technically, we compare single mothers to married mothers. Ideally, we would compare *families* headed by a single mother to *families* headed by a married couple, but the FSS data does not include family weights. Strictly speaking, our sample is weighted to be representative of mothers, not of families. Alternatively, we could have chosen to compare *households* headed by single females to households headed by married couples. This would make our exposition somewhat easier, since the food security items are measured at the household level. But shifting from mothers to households as our unit of analysis could obscure changes in food security when households “double up”. The number of food-insecure households, for example, might be artificially reduced as a result of two food-insecure households moving in together to form a single household. Nevertheless, we tried comparing households and also compared children of single mothers to children of married couples. The results mirrored the trends that we report here for mothers. Finally, we also tried comparing single mothers to single adult women who do not live in families and are non-elderly. Our results showed even greater relative gains for single mothers, but we are skeptical about whether single childless women are an appropriate comparison group.

public and private food programs. Over 40,000 households participate in the FSS each year -- more than 80 percent of eligible households in the CPS sample and over 85 percent of those who choose to participate in the CPS (see Appendix Table A.1, lines 4-6).³

In odd-numbered years the Census Bureau conducted the FSS in April. In even-numbered years it conducted the survey in August or September. Because all five surveys collect data for the previous twelve months, the choice of survey month should in theory be irrelevant. In reality, however, respondents interviewed at the end of the summer report more food-related problems than respondents interviewed in April. No one seems to know why this is the case. Our bivariate analyses therefore focus on the three April surveys, which were conducted in 1995, 1997, and 1999. Our regression analyses include all five years, along with a dummy variable that distinguishes the two end-of-summer surveys from the three April surveys.⁴ Seasonal effects do not influence any of our conclusions.

The eighteen items that USDA uses to determine a household's level of food security comprise the core of the FSS. Ten of these items are asked of all households. Eight are asked only of households that include children under the age of eighteen. USDA classifies households as "food insecure" if they report three or more of the eighteen "core" problems. It further classifies households according to the degree of hunger present.⁵ To illustrate trends for problems of differing severity we present data on five dichotomous measures drawn from the core. In addition, we looked at more than thirty other measures of food-related problems not drawn from the core. For brevity, we highlight ten measures that seemed to us representative of the full set of FSS items.⁶

³ In all analyses, we weight the FSS data to be representative of the civilian non-institutional population of the United States. We present descriptive statistics for our samples in Appendix Table A.2.

⁴ The 1996-1998 trends (not shown) are broadly similar to the 1997-1999 trends.

⁵ The USDA assumes that hunger is present if a household experiences eight problems and includes children or if it experiences six problems and includes no children.

⁶ We chose not to use the FSS's experimental "split ballot" items in our analysis. Subsets of respondents in each survey year were given slightly modified versions of some FSS questions. These subsets are each representative of the larger FSS sample. Because the modified versions elicit different response patterns than the items that remain consistent from year to year, they introduce error into estimates of trends. Omitting the experimental versions reduces the sample size by one-fourth or one-eighth, depending on the year and the item in question.

To reduce respondent burden, the FSS uses screening questions to identify households that might have had food-related problems of varying severity. The eighteen items in the USDA food security index were only asked of those whom the screener identified as being at risk of food insecurity, and the items dealing with severe problems were asked of an even more restricted sample in some years. These screens inevitably exclude a few people who would have been classified as food insecure or hungry if they had been asked all eighteen questions. The screens also changed slightly over time. USDA has developed a series of "common screens" that try to make the data consistent from year to year, but the common screen could introduce some bias in our trend estimates. We therefore check our conclusions by showing trends on three items that were asked of all respondents: whether household members were forced to borrow either food or money for food, whether they got emergency food from a church or food pantry, and whether they had to stretch the household's food supply due to a shortage of cash.⁷

In addition to our descriptive analysis, we also present several multivariate models that predict both continuous and dichotomous measures of food-related problems. In some equations we control family income. Our income measure comes from a 14-category question that the CPS asks all respondents, not from the more detailed responses collected in the March supplement. (The March data are only available for about half our sample.) We assign all respondents the logarithm of their income category's estimated midpoint.⁸

Analytic Methods

We use a "difference in differences" approach to estimate the effect of policies aimed at single mothers. We first calculate the trend in food-related problems for all single mothers. Then we calculate the difference between this trend and the trend for married mothers. We begin with observed trends and then present multivariate estimates in which we add various controls.

⁷ For more information on the screening methodology consult the appendix.

⁸ Respondents in the highest income category are assigned the logarithm of the value that is 150 percent of the interval's lower bound. The income measure refers to the income of the household head's family. We adjust our income figures to constant 1998 dollars using the CPI-U-RS.

Our analytic approach could be misleading if welfare reform had altered the distribution of the population across types of households, but the changes in children's living arrangements between March 1995 and March 1999 were tiny. Among families with children under eighteen, for example, the proportion headed by a single woman declined from 23.8 percent in 1995 to 23.4 percent in 1999.⁹ This change is statistically insignificant and far too small to affect our conclusions.

The proportion of single mothers who had never married did change between 1995 and 1999, rising from 37.5 to 42.4 percent. This change is statistically significant. If all else were equal, such a change would probably reduce child support payments to single mothers. But child support enforcement efforts increased during these years, so the net change in payments to single mothers was probably small. In any event we also show results with family income controlled, which should capture the effect of this and other changes.

Our analytic approach could also be misleading if single mothers' living arrangements had changed significantly between 1995 and 1999. If single mothers who lost their welfare benefits responded by moving in with relatives, for example, their food consumption might have remained constant while their housing conditions or subjective well-being deteriorated. In reality, however, the March CPS shows that the proportion of single mothers with no other adult in their household was 63.3 percent in 1995 and 63.7 percent in 1999. This change is also statistically insignificant and too small to affect any substantive conclusion. The trend in the percentage of single mothers living with adult relatives was also almost flat. The percentage of single mothers heading a household that included an adult nonrelative rose by 2.5 points, but the percentage living in a household headed by a nonrelative fell by 1.5 points. These two changes suggest that cohabiting single mothers were more likely to list themselves as the household head, perhaps because they were more likely to be working.

When we compare trends among single mothers to trends among married mothers, we can describe the results in two different ways. Suppose that P_{Y95} denotes the percentage of single mothers with problem Y in 1995 and that P_{Y99} denotes the percentage with problem Y in 1999. We can measure change in two ways:

⁹ We are indebted to Joseph Swingle for all our estimates using the March CPS.

$$\text{Absolute change} = P_{Y99} - P_{Y95}$$

$$\text{Proportional change} = (P_{Y99} - P_{Y95})/P_{Y95} = P_{Y99}/P_{Y95} - 1$$

An example helps clarify the difference between these two measures. Between 1995 and 1999 the proportion of adults who cut the size of their meals or skipped meals entirely fell from 17.7 to 12.3 percent among single mothers and from 5.1 to 3.6 percent among married couples with children. The absolute change is obviously larger for single mothers (5.2 versus 1.5 points). The proportional change is the same (about -0.3 in both cases). If we are concerned with the *consequences* of the change, the absolute benefits accruing to single mothers are greater because the absolute change is greater. If we are concerned with the *causes* of the change, however, it is quite possible that a single common cause, such as improved job opportunities, could have shifted both distributions upward at about the same proportional rate.

Results.

Absolute changes. Figure 1 shows trends in selected food-related problems for single mothers.¹⁰ Every food-related problem that we examined (including many not shown in Figure 1) was less common in 1999 than in 1995. In most cases the decline was statistically significant.¹¹ In many cases it was also quite large. When we compare changes between 1995 and 1997 to changes between 1997 and 1999, some of the problems in Figure 1 decline more in the first period while some decline more in the second period. In the latter period, however, several of the declines are not statistically significant at conventional levels (see Table 1). Nor is the apparent increase in the proportion of children who ate less than their mother thought they should statistically significant. These patterns also reflect those found in our broader set of food-related problems.

Reductions in food-related problems among single mothers and their families are reassuring, but distinguishing the effects of welfare reform from the effects of general prosperity requires a comparison between the families that were likely to be affected by

¹⁰ The prevalence rates should be interpreted as the percentage of single mothers living in households that experienced a problem, not the percentage of single mothers who experienced a problem. All of the FSS items are measured at the *household* level. For linguistic simplicity we generally ignore this distinction.

¹¹ See the appendix for information about how we estimated standard errors.

welfare reform with those unlikely to be affected by it. Table 1 shows that the absolute gap between single mothers and married couples with children (shown in the rows labeled "Difference") narrowed between 1995 and 1999 for all the indicators shown. This pattern also held for every other indicator that we examined. About half the declines in the absolute gap between single mothers and married couples with children were statistically significant at conventional levels.

Our estimates of changes in absolute gaps within the 1995-1997 and 1997-1999 periods are imprecise. With a few exceptions between 1997 and 1999, the absolute gap between single mothers and married couples appears to decline in both periods. All the statistically significant changes in the gap involve improvements in the relative position of single mothers. In a few cases the gap declines more between 1997 and 1999 than between 1995 and 1997. In a majority of cases, however, the declines in the gap between single mothers and married mothers are statistically insignificant within each of the two periods. In one case (children eating less than their mother thought they should) the gap between mother-only and married-couple families with children appears to widen between 1997 and 1999, although this change is not statistically significant either.

Multivariate Analysis. Our multivariate analyses extend the results in Table 1 in three ways. First, they cover 1996 and 1998 as well as 1995, 1997, and 1999, controlling for seasonal effects by adding a seasonal dummy. Second, they control for race and ethnicity, for the region in which a mother lives, and for whether she lives in a metropolitan area. Third, they allow us to investigate the extent to which declines in food-related problems are traceable to changes in purchasing power and household size.¹² For all our models, we examine whether trends in food-related problems differed between the 1995-1997 and 1997-1999 periods. We estimated models for single mothers that included separate trend variables for each period, and we estimated the same models for married mothers. By computing the difference between the trend coefficients for single

¹² Specifically, we control the log of family income and include dummy variables that indicate the number of adults in the mother's household, the number of children, and whether income data is missing. We assign all mothers in a household the family income of the household head. We also estimated a third equation that included the respondent's estimate of the family food expenditures, but this addition did not change any of our substantive results. Nor were the results affected when we included a dummy variable indicating food stamp receipt.

mothers and married mothers, we can determine whether the gap between the two groups narrowed or widened in each period.

One major problem was how best to summarize "food-related problems" in our multivariate analysis. A household's actual experience with food-related problems -- and thus its level of material well-being -- can only be approximated by its responses to the eighteen core FSS items. Our approach was to examine a wide range of dependent variables. The panels of Table 2 present our most reliable results.¹³ The first panel displays probit models that estimate the annual change in the probability that a household experienced *any* of the eighteen core problems in the twelve months prior to its interview. The first column indicates that between 1995 and 1997 both single mothers and married couples with children became less likely to experience food-related problems. The gap between the two groups shows no significant trend either between 1995 and 1997 or between 1997 and 1999.

When we control for income and household size in columns three and four, the pre-1997 trends are unaffected, but the proportion of single mothers experiencing a problem increases between 1997 and 1999. Experiencing a food-related problem also becomes more common for married mothers after 1997 when we control for family income ($p < 0.08$). These results imply that improvements among mothers before 1997 were unrelated to rising income. Between 1997 and 1999 real incomes had to rise in order to prevent an increase in food-related problems. Among mothers at a fixed real income level problems appear to increase in the late 1990's. We will return to these late 1990's trends later. For now we simply note that since food-related problems stopped declining among married mothers as well as single mothers, there is little reason to believe that welfare reform accounts for the pattern we observe.

The first panel of Table 2 presents an incomplete picture of changes in food-related problems, because it does not tell us whether hardship increased among mothers who reported one or more problems. Among respondents who report at least one food-related problem, one can use item response theory to construct an interval scale

¹³ Appendix Table A.3 provides the full results of the equations estimated in the panels of Table 2. For clarity and brevity, we report only the trend coefficients in Tables 2 through 6. Descriptive statistics for all our dependent and independent variables are provided in Appendix Table A.4.

measuring food insecurity. Based on the most common pattern of responses to the eighteen core questions, USDA assigns households a Rasch score that reflects the relative severity associated with a given number of problems (Hamilton et al., 1997). These Rasch scores reflect the fact that the difference between, say, nine and ten problems need not be the same as the difference between two and three problems. Were the FSS to ask a sufficiently large number of food-related questions, all households could be assigned Rasch scores. Because this is not practical, we cannot determine the level of food insecurity experienced by those households that avoided the particular problems included in the survey. These households have no Rasch score.

The bottom panel of Table 2 presents OLS estimates of annual changes in Rasch scores for mothers in households that reported at least one of the eighteen core food-related problems. The first column shows improvements for both single and married mothers prior to 1997. The second column again shows stagnation between 1997 and 1999. Once again the gap between single mothers and married couples with children shows no significant trend either between 1995 and 1997 or between 1997 and 1999. Note, too that the signs of these insignificant changes in the gap are the opposite of the signs in the first panel, suggesting that they are all due to sampling error. These results do not change when we control for income and household size.

Another way to measure changes in food-related problems is to consider the fraction of mothers who were "food insecure" by the USDA definition. Table 3 presents OLS estimates of annual changes in food insecurity so measured. Once again, trends were similar for single and married mothers, and the gap between them was relatively constant. Food insecurity declined between 1995 and 1997, and income gains appear to have prevented increases thereafter. Conditional on income, the models indicate that food insecurity increased between 1997 and 1999, but the increase is not significant at conventional levels ($p < 0.12$).¹⁴

¹⁴ We also used logistic regression models to predict the USDA measure, which yields more precise standard errors. Logistic regression estimates the change in the logged odds of an outcome rather than the absolute change. As we shall see, the proportionate reduction in food-related problems tends to be similar for all groups, so the gap between the two groups -- measured in proportionate terms -- is never significant in the logit models.

Ideally, we would like a summary measure of food-related problems that is both continuous and incorporates households that report none of the eighteen core problems. We tried several such measures. Our simplest summary measure is the total number of problems in the FSS core that a household experienced. This measure has the advantage of being intuitively understandable. It is also more precisely estimated than the other measures we tried, because this measure gives more weight to more common problems.¹⁵ But there is little reason to believe that the intervals between values on this measure meaningfully measure food insecurity. Table 4 shows OLS estimates of annual changes in the number of problems mothers reported. Once again we see improvement for both single and married mothers between 1995 and 1997, but this time the gap between the two groups narrows.¹⁶ Income gains appear to explain some, but not all, of the improvement for each group. Food-related problems increased significantly among married mothers between 1997 and 1999. They may have increased even more among single mothers, but the coefficient for single mothers is not statistically significant at conventional levels. The gap between the two groups changed little after 1997.

Because using the total number of problems as a measure of food insecurity is likely to underweight more serious problems, we constructed two alternate summary measures. Our first alternative assigned households that reported no problems a Rasch score of zero. We then estimated an OLS regression of the Rasch score on determinants of food insecurity such as income and family size plus a dummy variable for reporting no problems. The coefficient of the dummy variable tells us what score for zero-problem mothers would be consistent with the effects of the other independent variables on the Rasch scores of households that *did* report problems. We used this estimate to raise the Rasch scores of all households that experienced one or more problems, while keeping those that experienced no problems at zero.

In addition to this "Rasch re-scale" measure, we also constructed a "probit re-scale" measure. This measure assumes that food insecurity is normally distributed. We

¹⁵ Because problems are dichotomous and less than half the total sample reports any given problem, more frequent problems have more variance than less frequent problems. More frequent problems therefore contribute more to the variance of the unweighted sum of the total number of problems.

¹⁶ Ordered probit estimation of the same model (not shown) indicates much more modest improvements for single mothers prior to 1997, so that narrowing of the gap between single mothers and married couples is small and not statistically significant.

then estimate an ordered probit model that predicts the number of core problems and use the midpoints of the intervals produced by the model as our new measure of problems' severity. We provide greater methodological detail on our construction of both measures in the appendix.

Table 5 presents the results of OLS regression predicting these two summary measures. We present only the models that control for income and household size. (Because the scale for each measure is specific to the particular independent variables included in the statistical model used to construct it, it would make little sense to compare results with and without income controls.) The results are similar for both of these dependent variables. All mothers experienced declines in food-related problems between 1995 and 1997 and increases between 1997 and 1999.¹⁷ The earlier improvement was greater for single mothers, and so the gap between them and married mothers narrowed. After 1997, the setback may have been greater for single mothers, but the widening of the gap between single mothers and married mothers between 1997 and 1999 is not statistically significant.

Finally, we also constructed a measure of food-related problems faced by the adults within a household and two measures of problems faced by their children.¹⁸ Almost all parents report that they themselves experience more food-related problems than their children. This finding reflects the fact that most parents feed their children first when food is short, or at least say they do. The top panel of Table 6 indicates that the number of adult problems declined for all mothers both before and after 1997, though the declines after 1997 are to some extent explained by income gains. Furthermore, the gap between single mothers and married mothers narrowed between 1995 and 1997 and probably even between 1997 and 1999 ($p < 0.12$, before controlling for income). The middle panel of the table reveals that prior to 1997, all mothers' households experienced

¹⁷ The post-1997 increases for single mothers are statistically significant at $p < 0.12$ and $p < 0.06$ for the Rasch re-scale and probit re-scale equations.

¹⁸ The number of adult problems excludes, along with the child problems, the three household-level problems in the FSS core, which involve food insecurity rather than food insufficiency. The serious child problems measure is a count of the number of problems children experienced of the six that USDA uses to identify the presence of household hunger. It excludes the two most common child problems -- being unable to afford anything other than low-cost meals for children and being unable to afford balanced meals for children. The child hunger measure indicates that the respondent reported at least one of the six "serious" problems affecting children. The adult problems and serious child problems variables suffer from the same bias affecting the number of problems variable -- they overweight more common problems.

declines in the number of serious child problems and that improvements were greatest for single mothers. Between 1997 and 1999 there was little change among either group. Experience with child hunger, as shown in the bottom panel, became rarer among single mothers as compared to married mothers between 1995 and 1997, but once income is controlled there is a marginally significant increase ($p < 0.12$) among single mothers between 1997 and 1999.¹⁹

Summary of absolute changes. The material well-being of single mothers -- as reflected in various measures of food-related problems -- improved between 1995 and 1997, and these improvements were at least as large as the improvements among married couples with children. On many measures of food-related problems, hardship declined more among single mothers. Nor do we find much evidence that the position of single mothers deteriorated relative to that of married couples with children between 1997 and 1999. Instead, food-related problems either stopped falling or increased for *both* groups between 1997 and 1999.²⁰

Our finding that single mothers' food related problems did not fall between 1997 and 1999 and may even have increased once we control income is consistent with our earlier argument that moving from welfare to work increases single mothers' cash expenses and probably reduced their unreported income. But our finding that food-related problems also stopped falling among married couples with children between 1997 and 1999 is much harder to explain, and we do not think it should be taken at face value.

According to the March CPS, which has more detailed income data than the FSS surveys provide with their crude income measure, the median income of married couples with children (in 2000 CPI-U-RS dollars) increased from \$56,100 in 1995 to \$58,200 in 1997 and then jumped to \$62,200 in 1999. The median for mother-only families rose from \$18,200 in 1995 to \$18,500 in 1997, and \$20,600 by 1999.²¹ Tabulations by our colleague Joe Swingle using the March CPS indicate that household income increased between 1994-1996 and 1997-1999 for all married mothers and for all but the poorest

¹⁹ Logistic regression (not shown) indicates that child hunger declined more among single mothers prior to 1997 and increased more from 1997 to 1999, but shows no statistically significant changes in the gap between single and married mothers.

²⁰ USDA published figures show the same 1997-1999 stagnation among households, persons in households, adults in households, and children in households. See Andrews, et. al. (2000).

²¹ See Historical Income Tables from the March CPS (<http://www.census.gov/hhes/income/histinc/f10.html>).

five percent of single mothers (Jencks, Swingle, and Winship, 2001). While these income increases could be misleading for single mothers, the only obvious reason we can see for thinking they might be misleading for couples with children is that on-going efforts to improve the Consumer Price Index could have led to underestimates of inflation after 1997. If that were the case, of course, the income increases among single mothers would also be spurious.

Furthermore, if food-related problems had really stopped falling or begun to increase across the board after 1997, we should expect to see a similar trend between August 1998 and September 2000. The FSS data for 2000 are not yet available for secondary analysis, but a recent USDA report summarizes both the 2000 results and the trend between 1998 and 2000 (Nord, et. al., 2002). The report finds that food insecurity, as the USDA defines it, declined among both married-couple households with children and female-headed households with children between 1998 and 2000. Given that our standard errors are rather large and are mostly consistent with sizable improvements among mothers after 1997, we strongly suspect that food-related problems also declined somewhat between 1997 and 1999.

While we cannot reject the possibility that improvements in food-related problems were greater for married mothers than for single mothers, neither do we have any reason to believe that the relative gains that single mothers experienced before 1997 -- when welfare reform was well underway in a large number of states -- stopped after that year. The results in Table 1, at least, suggest that food-related problems continued to decline at least as much among single mothers as among married mothers.

Proportional changes. One way to compare proportional changes in food-related problems among single and married mothers is to examine changes in the ratio of the two prevalence rates. If a particular problem was twice as common among single mothers as it was among married mothers in 1995 but by 1999 occurred at the same rate for both groups -- so that the ratio of prevalence rates declined from 2.0 to 1.0 -- then the proportional change in food-related problems was larger for single mothers. Table 1 shows that single mothers are three to five times as likely as married mothers to report experiencing a given food-related problem. These ratios did not change much between

1995 and 1999.²² Single mothers report 3.4 times as many total problems as married couples with children in both 1995 and 1999. Likewise, if we look at the problems in the USDA food security index one at a time, there are no statistically significant differences in the proportional improvements for single versus married mothers. We made more than forty such comparisons, so two should have been significant at the .05 level by chance alone. Since none of the forty-plus comparisons was significant at this level, we conclude that the proportional reduction in food-related problems was about the same for both groups. This was true between 1995 and 1997 as well as between 1997 and 1999. Regression results (not shown) tell the same story.

Robustness checks

Severe versus mild problems. One possible objection to the findings reported in Tables 1 through 6 is that they over-emphasize the most common food-related problems and under-emphasize severe problems. If this were a source of bias, however, relatively rare problems should have fallen proportionately less than more common problems. In fact, proportionate declines in the least common food-related problems are similar to those for more common ones.²³

From 1995 to 1999 none of the fifteen “severe” items we examined showed statistically significant increases, while two showed statistically significant declines.²⁴ The proportion of single mothers who lived in a household where hunger was present declined from 11.4 to 7.4 percent. Fewer single mothers also reported that adults in their household were forced to cut the size of a meal or skip a meal in at least three different months of the preceding year. None of the differences in proportional changes when we compare single mothers to married mothers is statistically significant.

²² Because the denominator of the ratio represents married mothers, who have very low prevalence rates in some cases, small changes in the rate for married mothers can sometimes cause deceptively large changes in the ratio.

²³ The most common adult problems tended to show greater proportional improvement after 1997 than the less common adult problems, while the opposite pattern prevailed for children’s problems. None of these differences is statistically significant.

²⁴ Results not shown. The items we designate as “severe” include problems that were “often” experienced or experienced in three or more months (or all months) during the preceding year. The USDA’s measure of household hunger is also included in this group.

Poor single mothers. Primus et al. (1999) have argued that while incomes rose for many single mothers after welfare reform, they fell among the poorest ten percent of single mothers. If welfare reform increased the dispersion of income among single mothers, food insecurity and insufficiency could have increased among the poorest single mothers while falling for the less impoverished majority.

To examine this possibility we repeated the analysis in Table 1 for those with incomes below the federal poverty line.²⁵ The vast majority of the problems that we examined showed improvement among poor single mothers from 1995 to 1999 as well as in the periods before and after 1997. Many of the declines, especially from 1995 to 1999, are statistically significant. There were no statistically significant increases. When we compare poor single mothers to married mothers who are poor, nearly all of the changes in the absolute gap are statistically insignificant, though most of the gaps narrow over time.

Survey problems. The representativeness of the sample responding to the FSS could have changed over time. Based on our tabulations, however, it appears that in any one of the five survey years only 1.0 to 2.5 percent of households that passed the pre-core screen failed to answer all the questions they were then asked. Item nonresponse was only 0.6 points higher in 1999 than in 1995, and it declined by 0.7 points between 1997 and 1999.

Changes in the USDA's screening methodology are also unlikely to have artificially produced the trends we find. Responses to questions that were asked prior to any screens being administered (or asked of everyone at the very end of the interview) show the same patterns of improvement as responses to the core items of the food security index (see the last three items in Table 1).

Conclusions

²⁵ Results not shown. To identify poor households, we use CPS data on household size and income along with official Census poverty thresholds for families of different sizes and for individuals living alone. By matching thresholds for different *family* sizes to *households* of different sizes, we effectively treat a household as a family. This methodology assumes that families share their resources with others in their households, and it ignores household income other than that earned by the primary family. This strategy is imperfect, but appears to be the best way to approximate official poverty definitions in the absence of the additional detail provided in the March Demographic Supplement to the CPS.

Our findings provide little evidence that welfare reform aggravated food-related problems among single mothers or their children between 1995 and 1999. The absolute gaps between single mothers and married mothers narrowed steadily between 1995 and 1997, and at worst remained constant afterwards. Proportional gaps remained roughly constant over the entire period, since single mothers started out with more problems. The implications of these findings depend, however, on our counterfactual (what we think would have happened in the absence of welfare reform). The two most plausible counterfactuals appear to be what we will label the “rising tide lifts all boats” hypothesis and the “social isolation” hypothesis.

The “rising tide” hypothesis predicts that even in the absence of welfare reform the prosperity of the late 1990s would have reduced food insecurity and insufficiency by about the same proportion for both single mothers and married couples with children. Since that is what we actually observe, this counterfactual implies that welfare reform had no effect, either positive or negative, on single mothers’ food-related problems.

The “social isolation” hypothesis predicts that prosperity would not have lured many single mothers into the labor force in the absence of welfare reform. If we also assume that welfare benefits would have risen less than wages in the absence of welfare reform, the social isolation hypothesis implies that single mothers would have benefited less from prosperity than married couples with children, who were more integrated into the labor force. This counterfactual is consistent with what we observe in the late 1980s. If this is also the appropriate counterfactual for the late 1990s, our findings suggest that single mothers fared better after welfare reform than they would have fared in its absence.

There is no simple way of adjudicating between these two hypotheses using the FSS. The most promising strategy would be to compare trends in states where the welfare rolls fell dramatically between 1995 and 1999 to trends in states where the rolls fell less. But doing this would require careful work to figure out what really happened in each state, since declines in the welfare rolls often involve re-labeling the programs from which individuals receive benefits. That task remains a challenge for the future.

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Appendix A

Food Security Supplement Screening Methodology. In order to reduce respondent burden, the Food Security Survey uses screens that attempt to minimize the number of questions a respondent must answer. From 1995 to 1997 the FSS used a single screen that considered responses to the initial food insecurity and insufficiency questions as well as the respondent's family income. If a respondent gave no or little evidence that her household had experienced any food-related problems, the survey interviewer skipped the core section of the FSS. Beginning in 1998, USDA added two additional screens within the core section of eighteen items. These items are generally asked in increasing order of severity. Respondents who indicate few problems in an early stage are skipped through subsequent stages.

Screening assumes that all households resemble the "modal" household in their response patterns: if they do not report relatively common problems they will not report rarer problems. Since this is not completely true, a few households are screened out even though they would have reported additional food-related problems in the absence of the screens. The screens therefore introduce a small downward bias in estimates of the extent of food-related problems. Appendix Table A.1, lines 7-9, shows the percent of the FSS sample removed by each screen in each year.

The screening criteria changed between 1995 and 1997, and the entire methodology changed in 1998, when the additional screens were added. Such inconsistency affects year-to-year comparisons, because different proportions of the sample were questioned about relatively severe problems in different years. To address this problem, USDA has constructed a set of "common screens" that may be applied *post-hoc* to each year's sample. The common-screen includes an initial screen before the core section of the FSS, and two internal screens within the core. The common screens have the effect of screening out some households that actually answered relatively severe questions (because they passed through the screen that was actually used in the year they were surveyed). Although this biases estimates of food insecurity and insufficiency downward, it should make the bias more uniform over time. Appendix Table A.1 shows the effects of the three common screens each year, expressed as the percentage of the FSS

sample removed (lines 10-12). All data in this paper is based on using the common screens.

Standard Error Estimates. Because the CPS uses a complex sample design that includes stratification, clustering, and post-stratification adjustment, formulas that assume a simple random sample yield standard errors that are too small. Bootstrapping and similar replication techniques will also fail to produce appropriate standard errors if they do not account for the CPS's sample design. Such an accounting requires statistical packages with capabilities beyond those typically used by researchers.

An alternative to these replication methods is to use the "generalized variance parameters" published by the Census Bureau to estimate standard errors. These parameters deflate the weighted number of observations in a standard error formula to what the number of observations would be if the CPS were a simple random sample that produced the same variance of sample estimates as the complex CPS sample does. Standard errors can then be recomputed based on this deflated sample size.

The Census Bureau estimates the generalized variance parameters for groups of related variables, using replication methods and regression analysis on several years of CPS data. Different parameters are provided for different groups of variables, such as educational attainment variables, and for different populations (e.g., persons, families, movers, etc.). One must select the parameter that is most appropriate for one's analysis. For each year we chose the parameter appropriate for analyses of household-level characteristics of selected (as opposed to *all*) household members. These parameters seemed the most appropriate because food-related problems are measured at the household level, and within households we focus only on mothers. We obtained these parameters from the March Demographic Supplement to the CPS rather than from the FSS because the parameters from the latter survey do not appear to account for the loss of sample that occurs as a result of FSS nonparticipation. We inflated the March parameters for each year by the ratio of the CPS sample size to the FSS sample size in order to account for the sample loss.²⁶

²⁶ We are indebted to Mark Nord for suggesting this procedure.

Our approach yields conservative standard error estimates because the person-level parameters we use -- those for *selected* household members -- are over twice as large as the parameters for families and households published by the Census Bureau. As a result the person-level parameters deflate our sample sizes more than the family or household parameters would, making our standard error estimates correspondingly larger.

Using the family- or household-level parameters might be justified, since we are generally considering only one person per family (the mother). Had we used the family or household parameters, more of our trends would become statistically significant. However, research conducted by the USDA has determined that using even the largest of the family and household-level parameters -- the one for poverty variables -- results in standard errors that are about 15 to 25 percent smaller than replication-based estimates.²⁷

Creation of New Interval Measures of Food Insecurity. In the multivariate analyses we conduct, we use two measures of food insecurity that attempt to order all mothers -- both those who did and did not experience FSS core food-related problems -- on an interval scale. Our first measure, the Rasch re-scale, is based on USDA's Rasch scores included in the data. In any year, all households that report the same number of problems received the same Rasch score, except that a given number of problems corresponds to a different score depending on whether or not the household includes children. But the two scales (one for households with children, one for childless households) changed in 1998. As a result, households experiencing four problems did not receive the same Rasch score in 1998 as in 1997.

We first recoded the 1995-1997 Rasch scores to their 1998-1999 values. We also recoded to zero Rasch scores of households that were screened out prior to the core of the FSS and Rasch scores of households that did not experience any problems. As discussed above, these households are food secure, but cannot be assigned a conventional Rasch score because it is not possible to determine their true levels of food insecurity. We then conducted OLS regression on the entire sample of mothers to predict Rasch scores, including as regressors all of those from our eventual models (including the income and

household size variables), a dummy indicating whether a mother was single or not, and a dummy indicating whether we had recoded a mother's score to zero. Finally, we recoded all non-zero Rasch scores, shifting them upward by an amount equal to the coefficient on the dummy for having been assigned a value of zero. In this way, we attempted to recalibrate the Rasch scale so that experiencing no food-related problems represented a true zero point in terms of food insecurity.

Our second interval measure of food insecurity, the probit re-scale, is based on an ordered probit model estimating the number of problems a mother experienced. To construct this measure, we assumed that food insecurity is normally distributed. We then estimated the ordered probit model, again using the pooled sample of mothers and adding a single mother dummy to our full set of regressors. Maximum likelihood estimation of the model produces estimates of the true regression coefficients that would be most likely to produce the observed sample of mothers, given the assumption that food insecurity is distributed normally. It simultaneously produces estimates of cut points in the distribution of (unobserved) food insecurity that bound the range of food insecurity values that are consistent with given (observed) food problem totals.

Eighteen cut points were estimated, creating nineteen intervals that correspond to the different number of food-related problems a mother could report experiencing (0-18). We computed the midpoints of all but the lowest and highest intervals and assigned mothers the value of these midpoints as their probit re-scale score. Since the distribution of food insecurity is assumed to be normal, the bottom (top) interval has no lower (upper) bound. In order to compute a midpoint of sorts for these intervals, we calculated the food insecurity values that corresponded with the 0.005 and 0.995 percentiles in the estimated distribution of food insecurity, and used these as lower and upper bounds.

²⁷ While the standard errors in our multivariate models account for the fact that a single household may contain more than one mother -- and so observations are not independent -- they do not account for the complex CPS sample design.

Figure 1
Trends in Single Mothers' Food-Related Problems

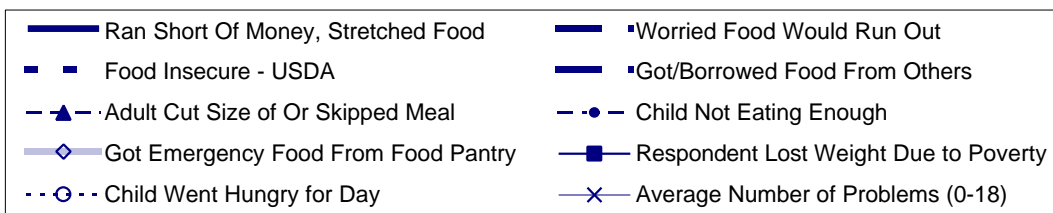
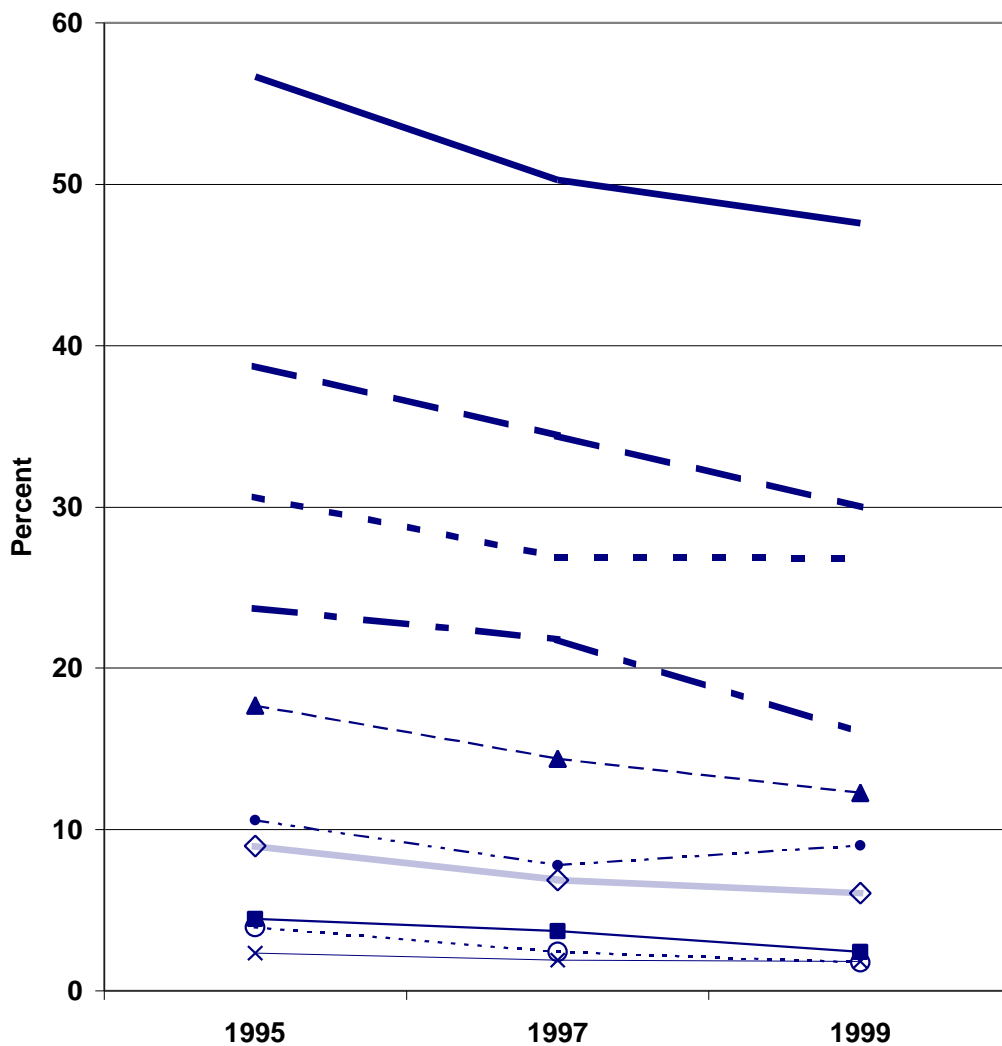


Table 1: Prevalence of Selected Food-Related Problems among Single Mothers and Married Couples with Children in FSS: 1995-1999
(standard errors in parentheses)

	Survey year			Change			p		
	1995	1997	1999	1995-97	1997-99	1995-99	1995-97	1997-99	1995-99
Food Insecure - USDA									
Single Mother	30.6 (1.1)	26.9 (1.3)	26.8 (1.3)	-3.8 (1.7)	-0.1 (1.8)	-3.8 (1.7)	0.026	0.969	0.023
Married with Child	9.9 (.4)	7.7 (.5)	8.2 (.5)	-2.3 (.6)	0.5 (.7)	-1.8 (.6)	0.000	0.452	0.007
Difference	20.7 (1.2)	19.2 (1.4)	18.7 (1.3)	-1.5 (1.8)	-0.6 (1.9)	-2.1 (1.8)	0.404	0.765	0.248
Ratio	3.1 (.2)	3.5 (.3)	3.3 (.2)	0.4 (.3)	-0.2 (.4)	0.2 (.3)	0.198	0.540	0.523
Average Number of Problems (0-18)									
Single Mother	2.3 (.1)	1.9 (.1)	1.8 (.1)	-0.4 (.1)	-0.1 (.1)	-0.5 (.1)	0.001	0.612	0.000
Married with Child	0.7 (.0)	0.5 (.0)	0.5 (.0)	-0.2 (.0)	0.0 (.0)	-0.2 (.0)	0.000	0.983	0.000
Difference	1.6 (.1)	1.4 (.1)	1.3 (.1)	-0.3 (.1)	-0.1 (.1)	-0.4 (.1)	0.035	0.626	0.008
Ratio	3.4 (.2)	3.5 (.3)	3.4 (.3)	0.2 (.3)	-0.1 (.4)	0.0 (.3)	0.624	0.731	0.907
Worried Food Would Run Out									
Single Mother	38.7 (1.2)	34.4 (1.2)	30.0 (1.2)	-4.3 (1.7)	-4.4 (1.7)	-8.7 (1.7)	0.009	0.008	0.000
Married with Child	12.9 (.5)	10.7 (.5)	9.6 (.5)	-2.2 (.7)	-1.1 (.7)	-3.3 (.7)	0.001	0.098	0.000
Difference	25.8 (1.3)	23.7 (1.3)	20.4 (1.3)	-2.1 (1.8)	-3.3 (1.8)	-5.4 (1.8)	0.244	0.067	0.003
Ratio	3.0 (.1)	3.2 (.2)	3.1 (.2)	0.2 (.2)	-0.1 (.3)	0.1 (.2)	0.343	0.740	0.599
Adult Cut Size of Or Skipped Meal									
Single Mother	17.7 (.9)	14.4 (.9)	12.3 (.9)	-3.3 (1.3)	-2.1 (1.3)	-5.4 (1.3)	0.009	0.091	0.000
Married with Child	5.1 (.3)	3.9 (.3)	3.6 (.3)	-1.3 (.4)	-0.3 (.4)	-1.6 (.5)	0.005	0.491	0.001
Difference	12.6 (1.0)	10.5 (.9)	8.7 (1.0)	-2.0 (1.3)	-1.8 (1.3)	-3.9 (1.4)	0.129	0.170	0.005
Ratio	3.4 (.3)	3.7 (.4)	3.4 (.4)	0.3 (.5)	-0.3 (.5)	0.0 (.5)	0.562	0.595	0.966
Respondent Lost Weight Due to Poverty									
Single Mother	4.5 (.5)	3.7 (.5)	2.4 (.4)	-0.7 (.7)	-1.3 (.6)	-2.0 (.6)	0.277	0.037	0.002
Married with Child	1.0 (.2)	0.8 (.1)	0.5 (.1)	-0.3 (.2)	-0.3 (.2)	-0.6 (.2)	0.215	0.086	0.003
Difference	3.4 (.5)	2.9 (.5)	1.9 (.4)	-0.5 (.7)	-1.0 (.6)	-1.5 (.7)	0.490	0.123	0.027
Ratio	4.3 (.8)	4.8 (1.0)	5.0 (1.5)	0.4 (1.3)	0.3 (1.8)	0.7 (1.7)	0.735	0.872	0.663

continued on next page

Table 1 (continued)

	Survey year			Change			p		
	1995	1997	1999	1995-97	1997-99	1995-99	1995-97	1997-99	1995-99
Child Not Eating Enough									
Single Mother	10.6 (.7)	7.8 (.7)	9.0 (.8)	-2.8 (1.0)	1.2 (1.0)	-1.6 (1.1)	0.005	0.239	0.154
Married with Child	2.7 (.2)	2.1 (.2)	2.3 (.3)	-0.6 (.3)	0.1 (.3)	-0.4 (.4)	0.087	0.680	0.235
Difference	7.9 (.8)	5.7 (.7)	6.8 (.9)	-2.2 (1.0)	1.1 (1.1)	-1.2 (1.2)	0.032	0.321	0.320
Ratio	3.9 (.4)	3.6 (.5)	4.0 (.6)	-0.3 (.7)	0.3 (.8)	0.0 (.7)	0.670	0.674	0.962
Child Went Hungry for Day									
Single Mother	4.0 (.5)	2.4 (.4)	1.8 (.4)	-1.6 (.6)	-0.6 (.6)	-2.2 (.6)	0.016	0.266	0.000
Married with Child	0.9 (.1)	0.5 (.1)	0.4 (.1)	-0.4 (.2)	-0.1 (.2)	-0.4 (.2)	0.045	0.719	0.016
Difference	3.1 (.5)	1.9 (.5)	1.3 (.4)	-1.2 (.7)	-0.6 (.6)	-1.8 (.6)	0.078	0.333	0.005
Ratio	4.6 (.9)	4.9 (1.5)	4.1 (1.4)	0.3 (1.8)	-0.8 (2.1)	-0.5 (1.7)	0.863	0.695	0.763
Ran Short Of Money, Stretched Food									
Single Mother	56.7 (1.2)	50.3 (1.2)	47.6 (1.3)	-6.4 (1.7)	-2.7 (1.8)	-9.1 (1.8)	0.000	0.133	0.000
Married with Child	34.6 (.7)	29.0 (.7)	27.5 (.7)	-5.7 (1.0)	-1.5 (1.0)	-7.1 (1.0)	0.000	0.145	0.000
Difference	22.0 (1.4)	21.3 (1.4)	20.1 (1.5)	-0.7 (2.0)	-1.3 (2.1)	-2.0 (2.1)	0.724	0.545	0.342
Ratio	1.6 (.0)	1.7 (.1)	1.7 (.1)	0.1 (.1)	0.0 (.1)	0.1 (.1)	0.189	0.943	0.251
Got/Borrowed Food From Others									
Single Mother	23.7 (1.0)	21.8 (1.0)	16.0 (1.0)	-2.0 (1.4)	-5.8 (1.4)	-7.7 (1.4)	0.174	0.000	0.000
Married with Child	6.8 (.4)	5.5 (.3)	4.0 (.3)	-1.3 (.5)	-1.4 (.5)	-2.7 (.5)	0.011	0.003	0.000
Difference	17.0 (1.1)	16.3 (1.1)	12.0 (1.0)	-0.7 (1.5)	-4.4 (1.5)	-5.0 (1.5)	0.666	0.003	0.001
Ratio	3.5 (.2)	4.0 (.3)	4.0 (.4)	0.5 (.4)	0.0 (.5)	0.5 (.5)	0.231	0.958	0.332
Got Emergency Food From Food Pantry									
Single Mother	9.0 (.7)	6.9 (.6)	6.1 (.6)	-2.1 (.9)	-0.8 (.9)	-2.9 (.9)	0.023	0.361	0.002
Married with Child	2.7 (.2)	1.6 (.2)	1.4 (.2)	-1.2 (.3)	-0.2 (.3)	-1.4 (.3)	0.000	0.388	0.000
Difference	6.3 (.7)	5.3 (.6)	4.7 (.7)	-1.0 (1.0)	-0.6 (.9)	-1.5 (1.0)	0.327	0.531	0.119
Ratio	3.3 (.4)	4.4 (.7)	4.5 (.8)	1.1 (.8)	0.1 (1.0)	1.2 (.9)	0.159	0.889	0.164

Source: Food Security Supplement to the Current Population Survey, 1995-1999.

Unweighted sample sizes range from 1,212 to 9,931 for single mothers and 3,264 to 25,924 for married mothers, depending on the measure and year. For most measures, sample sizes are near the upper end of these ranges. Figures for single mothers and married mothers indicate the percentage of each group in a household that experienced a problem. The exception is the "average number of problems" measure, which provides the average number of core FSS problems experienced by the group in a given year. The "Difference" line is the prevalence rate for single mothers minus that for married mothers. The ratio is the single-mother prevalence rate divided by the married-mother rate. Single mothers improve relative to married mothers when the difference or ratio declines. Standard errors account for the CPS complex survey design (see the appendix).

Table 2: Experience with Food-Related Problems Among Mothers and Food Insecurity Among Those Mothers Reporting Problems

I. Annual Change in the Probability That a Mother's Household Experienced At Least One of the Eighteen Core Problems (Probit Estimation)

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.066	0.008	-0.054	0.041
SE	(.018)	(.019)	(.019)	(.020)
Married Mothers				
b	-0.054	-0.010	-0.038	0.027
SE	(.013)	(.014)	(.014)	(.015)
Absolute Gap (S-M)				
b	-0.012	0.018	-0.017	0.014
SE	(.022)	(.023)	(.024)	(.025)

II. Annual Change in Food Insecurity (Rasch Transformation) Among Households Experiencing One or More Problems

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.117	-0.033	-0.113	-0.019
SE	(.053)	(.053)	(.053)	(.053)
Married Mothers				
b	-0.150	0.018	-0.140	0.040
SE	(.048)	(.049)	(.048)	(.049)
Absolute Gap (S-M)				
b	0.034	-0.051	0.027	-0.059
SE	(.072)	(.072)	(.071)	(.072)

Source: Food Security Supplement to the Current Population Survey, 1995-1999. Bold coefficients are significant at $p < 0.05$. Unweighted sample sizes: top panel -- 17,032 single mothers, 49,502 married mothers; bottom panel -- 6,900 single mothers, 7,018 married mothers. The first panel displays coefficients from probit models predicting the probability of experiencing at least one of the eighteen problems in the FSS core. The second panel displays coefficients from least squares models estimating food insecurity as measured by the USDA Rasch scores. The Rasch scores have been adjusted to be consistent across all five years (see the appendix). R-squared values for the second panel are .01 and .02 for the single mother models (without and with income controlled) and .02 and .05 for the married mother models. Separate models were run with either single mothers or married mothers as the sample. Coefficients are for the relevant annual trend indicator, controlling for race/ethnicity, region, urbanity, and season in which the interview occurred. Negative coefficient values indicate improvement (declines in food problems). In the models represented by the right-most columns, we also control for number of adults, number of children, family income of the household head, and a dummy for missing income data. "Absolute Gap" is the computed difference between the coefficient for single mothers and that for married mothers. Negative values indicate that the gap between single and married mothers narrowed. Standard errors account for clustering of mothers within a household. See Appendix Table A.4 for the full results for these models.

Table 3: Annual Change in Food Insecurity (USDA Indicator) Among Mothers

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.018	0.002	-0.013	0.010
SE	(.006)	(.007)	(.006)	(.006)
Married Mothers				
b	-0.011	0.001	-0.008	0.006
SE	(.002)	(.002)	(.002)	(.002)
Absolute Gap (S-M)				
b	-0.007	0.001	-0.005	0.004
SE	(.007)	(.007)	(.007)	(.007)

Source: Food Security Supplement to the Current Population Survey, 1995-1999. Bold coefficients are significant at $p < 0.05$. The table displays coefficients from least squares models predicting whether or not a mother lives in a "food insecure" household according to the USDA definition. A household is food insecure if it experiences at least three of the eighteen FSS core problems. R-squared values for the models are .01 and .10 for single mother models (without and with income controlled) and .03 and .14 for married mother models. See Table 2 for additional notes.

Table 4: Annual Change in the Number of Core Problems Reported By Mothers

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.210	-0.011	-0.170	0.044
SE	(.048)	(.046)	(.046)	(.045)
Married Mothers				
b	-0.079	-0.010	-0.058	0.027
SE	(.015)	(.015)	(.014)	(.014)
Absolute Gap (S-M)				
b	-0.130	-0.002	-0.112	0.017
SE	(.051)	(.048)	(.049)	(.047)

Source: Food Security Supplement to the Current Population Survey, 1995-1999. Bold coefficients are significant at $p < 0.05$. The table displays coefficients from least squares models estimating the number of FSS core problems (out of 18) experienced by a mother's household. R-squared values for the models are .01 and .11 for single mother models (without and with income controlled) and .04 and .15 for married mother models. See Table 2 for additional notes.

Table 5: Annual Change in Food Insecurity (Re-scaling of Core Problems Total) Among Mothers**(Income and Household Size Controls Included)**

	Rasch-Based Re-scaling		Probit Cut Point-Based Re-scaling	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.208	0.109	-0.086	0.051
SE	(.061)	(.061)	(.027)	(.027)
Married Mothers				
b	-0.078	0.051	-0.032	0.022
SE	(.022)	(.022)	(.010)	(.010)
Absolute Gap (S-M)				
b	-0.130	0.058	-0.054	0.029
SE	(.065)	(.065)	(.029)	(.029)

Source: Food Security Supplement to the Current Population Survey, 1995-1999. Bold coefficients are significant at $p < 0.05$. The left-hand columns display coefficients from OLS models in which the dependent variable is a measure of food insecurity created by rescaling the USDA Rasch scores. The new scale includes households that reported experiencing none of the eighteen core FSS problems. R-squared values are .15 and .19 for the single mother model and married mother model. The right-hand columns display OLS coefficients for a model in which the dependent variable is an alternative interval-scale measure of food insecurity. The measure is based on the cut-point intervals produced by an ordered probit model predicting the number of core problems experienced. R-squared values are .16 and .20 for the models including single mothers and married mothers. See the appendix for a detailed explanation of our re-scaling procedures. Because the new interval scales we created depend on the variables used in the models that created them, it is not meaningful to compare coefficients before and after income is added. Both of the above models control for our full set of independent variables. See Table 2 for additional notes.

Table 6: Food-Related Problems Specific to Adults or Children

I. Annual Change in the Number of Food-Related Problems Affecting Adults

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.071	-0.044	-0.059	-0.026
SE	(.019)	(.018)	(.019)	(.018)
Married Mothers				
b	-0.023	-0.014	-0.017	-0.004
SE	(.006)	(.006)	(.006)	(.005)
Absolute Gap (S-M)				
b	-0.048	-0.030	-0.041	-0.023
SE	(.020)	(.019)	(.020)	(.019)

II. Annual Change in the Number of Serious Food-Related Problems Affecting Children

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.028	-0.008	-0.024	-0.004
SE	(.010)	(.009)	(.010)	(.010)
Married Mothers				
b	-0.007	-0.002	-0.005	0.001
SE	(.003)	(.002)	(.002)	(.002)
Absolute Gap (S-M)				
b	-0.021	-0.006	-0.019	-0.005
SE	(.011)	(.010)	(.011)	(.010)

III. Annual Change in Child Hunger

	No Income / Household Size Controls		Income and Household Size Controlled	
	1995-1997	1997-1999	1995-1997	1997-1999
Single Mothers				
b	-0.014	0.004	-0.012	0.007
SE	(.004)	(.004)	(.004)	(.004)
Married Mothers				
b	-0.002	-0.001	-0.001	0.000
SE	(.001)	(.001)	(.001)	(.001)
Absolute Gap (S-M)				
b	-0.012	0.006	-0.010	0.006
SE	(.005)	(.004)	(.004)	(.004)

Source: Food Security Supplement to the Current Population Survey, 1995-1999. Bold coefficients are significant at $p < 0.05$. The top panel displays coefficients from models predicting the number of adult-specific problems that a mother's household experienced (out of seven). R-squared values -- .01 and .06 for single mother models (without and with income controlled) and .01 and .07 for married mother models. The coefficients in the middle panel refer to number of child problems experienced by a mother's household, excluding those child problems that do not correspond to household hunger. A maximum of six serious child problems is possible. R-squared values -- .01 and .03 for single mother models (without and with income controlled) and .02 and .05 for married mothers. The bottom panel's coefficients are from models predicting whether or not a mother's household experienced at least one of the serious child problems. R-squared values -- .02 and .05 for single mother models (without and with income controlled) and .03 and .07 for married mother models. See Table 2 for additional notes.

Table A.1: CPS and FSS Sample Sizes, Rates of Nonparticipation, and Effects of Screens

	Survey year				
	1995	1996	1997	1998	1999
1 Potential Sample Size (Households)	57,765	50,734	50,801	51,225	51,341
2 CPS Participants	53,665	47,795	47,306	47,761	47,500
3 Nonparticipation in CPS (Percent)	7.1	5.8	6.9	6.8	7.5
4 FSS Participants	44,647	41,811	41,146	43,744	41,311
Nonparticipation in FSS as Percent of:					
5 Potential CPS Sample	22.7	17.6	19.0	14.6	19.5
6 CPS Participants	16.8	12.5	13.0	8.4	13.0
Percent Screened by Administered Screen(s)					
7 Preliminary Screen	58.9	73.8	72.8	55.0	58.2
8 First Internal Screen				25.1	23.9
9 Second Internal Screen				11.0	10.6
Percent Screened by Common Screens					
10 Preliminary Screen	78.2	78.0	79.9	80.0	81.6
11 First Internal Screen	6.7	6.9	3.3	5.1	5.0
12 Second Internal Screen	7.4	7.0	7.3	7.1	7.0

Source: 1995-1999 Food Security Supplement to the Current Population Survey. For background on the FSS screening methodology, see the appendix.

Table A.2: Food Security Supplement Descriptive Statistics: 1995-1999
(standard errors in parentheses)

	Survey year			Change			p		
	1995	1997	1999	1995-97	1997-99	1995-99	1995-97	1997-99	1995-99
Age									
Single Mother	33.1 (.2)	33.8 (.2)	33.9 (.2)	0.7 (.3)	0.1 (.3)	0.8 (.3)	0.021	0.875	0.017
Married with Child	36.1 (.1)	36.4 (.1)	36.9 (.1)	0.4 (.2)	0.4 (.2)	0.8 (.2)	0.019	0.013	0.000
Household Size									
Single Mother	3.67 (.04)	3.68 (.04)	3.64 (.04)	0.01 (.06)	-0.04 (.06)	-0.04 (.06)	0.915	0.475	0.530
Married with Child	4.19 (.02)	4.20 (.02)	4.20 (.02)	0.01 (.03)	0.00 (.03)	0.01 (.03)	0.588	0.899	0.689
Family Income									
Single Mother	22,461 (549)	23,815 (592)	26,518 (695)	1,353 (808)	2,704 (913)	4,057 (886)	0.094	0.003	0.000
Married with Child	55,280 (556)	56,916 (555)	60,522 (595)	1,636 (785)	3,606 (813)	5,241 (814)	0.037	0.000	0.000
Race/Ethnicity									
Single Mother									
Non-Hispanic White	50.9 (1.2)	49.2 (1.2)	50.7 (1.3)	-1.8 (1.7)	1.5 (1.8)	-0.2 (1.8)	0.307	0.394	0.902
Non-Hispanic Black	32.4 (1.1)	32.6 (1.1)	29.9 (1.2)	0.2 (1.6)	-2.8 (1.7)	-2.5 (1.7)	0.891	0.100	0.127
Hispanic	14.0 (.8)	15.1 (.9)	16.1 (1.0)	1.1 (1.2)	1.1 (1.3)	2.2 (1.3)	0.360	0.423	0.093
Other	2.7 (.4)	3.2 (.4)	3.3 (.5)	0.4 (.6)	0.2 (.6)	0.6 (.6)	0.449	0.814	0.337
Total	100.0	100.0	100.0						
Married with Child									
Non-Hispanic White	77.2 (.6)	75.8 (.7)	73.0 (.7)	-1.4 (.9)	-2.8 (1.0)	-4.2 (1.0)	0.117	0.005	0.000
Non-Hispanic Black	7.3 (.4)	7.3 (.4)	7.5 (.4)	-0.1 (.6)	0.2 (.6)	0.1 (.6)	0.871	0.692	0.808
Hispanic	11.8 (.5)	12.1 (.5)	14.0 (.6)	0.3 (.7)	1.9 (.8)	2.2 (.7)	0.654	0.011	0.003
Other	3.7 (.3)	4.9 (.3)	5.5 (.4)	1.2 (.4)	0.6 (.5)	1.8 (.5)	0.006	0.204	0.000
Total	100.0	100.0	100.0						

Source: 1995-1999 Food Security Supplement to the CPS. Family income refers to the household head's family. Standard errors account for the complex CPS sample design.

**Table A.3: Experience with Food-Related Problems Among Mothers and Food Insecurity
Among Those Mothers Reporting Problems -- Full Results**

Dependent and independent variables	Single Mothers				Married Mothers			
	B	SE	B	SE	B	SE	B	SE
Probability of Having At Least One Problem								
Trend 1995-1997	-0.066	0.018	-0.054	0.019	-0.054	0.013	-0.038	0.014
Trend 1997-1999	0.008	0.019	0.041	0.020	-0.010	0.014	0.027	0.015
Late summer interview?	0.061	0.024	0.076	0.025	0.063	0.017	0.048	0.019
North (south is omitted)	0.011	0.031	0.004	0.033	-0.140	0.023	-0.077	0.026
Midwest	0.070	0.032	0.048	0.034	-0.087	0.022	-0.063	0.024
West	0.175	0.033	0.192	0.035	0.081	0.022	0.080	0.025
Rural (urban is omitted)	-0.193	0.030	-0.013	0.032	-0.245	0.020	0.030	0.022
Unknown urbanity	-0.110	0.039	-0.002	0.041	-0.184	0.027	0.004	0.029
Black (nonHisp white omit.)	0.362	0.027	0.103	0.030	0.513	0.030	0.267	0.034
Hispanic	0.344	0.036	0.077	0.039	0.681	0.024	0.168	0.028
Other race/ethnicity	0.084	0.061	-0.047	0.065	-0.002	0.038	-0.220	0.045
Log income			-0.469	0.014			-0.792	0.014
Missing income			-0.320	0.055			-0.616	0.042
Household size dummies	No		Yes		No		Yes	
Number of problems (0-18 or 0-10)¹								
Trend 1995-1997	-0.117	0.053	-0.113	0.053	-0.150	0.048	-0.140	0.048
Trend 1997-1999	-0.033	0.053	-0.019	0.053	0.018	0.049	0.040	0.049
Late summer interview?	0.150	0.069	0.154	0.069	0.216	0.062	0.217	0.061
North (south is omitted)	0.003	0.092	-0.035	0.091	-0.084	0.086	-0.055	0.085
Midwest	0.048	0.091	0.012	0.091	-0.138	0.081	-0.099	0.080
West	0.153	0.098	0.152	0.098	0.024	0.078	0.027	0.076
Rural (urban is omitted)	0.207	0.083	0.238	0.082	0.204	0.068	0.322	0.068
Unknown urbanity	-0.045	0.109	-0.037	0.109	-0.081	0.093	0.030	0.093
Black (nonHisp white omit.)	-0.064	0.077	-0.117	0.078	0.274	0.103	0.169	0.102
Hispanic	0.045	0.102	0.054	0.106	0.402	0.076	0.142	0.079
Other race/ethnicity	-0.183	0.171	-0.174	0.170	0.272	0.143	0.081	0.144
Log income			-0.176	0.040			-0.508	0.043
Missing income			0.600	0.197			0.018	0.157
Household size dummies	No		Yes		No		Yes	
Constant	4.614	0.100	6.295	0.381	3.912	0.082	8.767	0.433
R ²	0.007		0.022		0.018		0.050	

Source: Food Security Supplement to CPS. Dummies for the number of adults and children are omitted. See notes to Table 2 for additional details.

Table A.4: Descriptive Statistics for Variables Included in Regressions

	Single Mothers		Married Mothers	
	Mean	S.D.	Mean	S.D.
Dependent Variables				
Has One or More Problems?	0.41	0.49	0.14	0.35
Rasch Score (If One or More Problems)	4.66	2.35	4.00	2.14
Food Insecure (USDA Measure)	0.29	0.45	0.09	0.28
Number of Problems (0-18 or 0-10)	2.09	3.41	0.60	1.88
Food Insecurity (Rasch Re-Scale)	3.60	4.62	1.17	2.99
Food Insecurity (Probit Re-Scale)	-6.45	2.02	-7.54	1.36
Number of Adult Problems (0-7)	0.60	1.41	0.15	0.72
Number of Serious Child Problems (0-6)	0.19	0.69	0.04	0.31
Child Hunger	0.11	0.31	0.03	0.16
Independent Variables				
Pre-1997 Trend (0=95,1=96, 2=97-99)	1.31	0.83	1.30	0.83
Post-1997 Trend (0=95-97, 1=98, 2=99)	0.56	0.78	0.56	0.78
North (South is Omitted Category)	0.20	0.40	0.21	0.40
Midwest	0.22	0.41	0.25	0.43
West	0.23	0.42	0.25	0.43
Rural (Urban is Omitted Category)	0.62	0.49	0.58	0.49
Unknown Urbanity	0.15	0.36	0.16	0.37
Black (Non-Hispanic Whites Omitted)	0.28	0.45	0.06	0.24
Hispanic	0.13	0.33	0.10	0.30
Log Income (1998 Dollars)	9.71	0.96	10.70	0.74
Missing Income Data (0=Missing)	0.05	0.23	0.06	0.23

Source: Food Security Supplement to the Current Population Survey, 1995-1999.

Sample sizes: 17,032 single mothers, 49,502 married mothers. See the notes for Tables 2-6 for details about the dependent variables. The Rasch scores have been adjusted to be consistent across all five years (see the appendix). Descriptive statistics for our "other race" dummy, for our dummy indicating a late-summer interview, and for our household size dummies are not shown.