Does Financial Literacy Contribute to Food Security?

Katherine G. Carman[*] and **Gema Zamarro**[**]
Katherine G. Carman: kcarman@rand.org
[*]RAND Corporation

[**]University of Arkansas & University of Southern California

Abstract

Food insecurity, not having consistent access to adequate food for active, healthy lives for all household members, is most common among low income households. However, income alone is not sufficient to explain who experiences food insecurity. This study investigates the relationship between financial literacy and food security. We find that low income households who exhibit financial literacy are less likely to experience food insecurity.

1. Introduction

A growing body of research has documented the significance of food insecurity in the United States, the characteristics of households experiencing food insecurity, and the harmful consequences. Food insecurity currently affects 14.3 percent of households in the U.S., including 5.6 percent with very low food security, meaning that the food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food (Coleman-Jensen et al., 2014). Household income has been found to be negatively correlated with food insecurity. However, income does not tell the whole story. Almost 7% of households with income 185 % above the federal poverty level (FPL) struggle with food insecurity, while 58% of households below the FPL do not (Coleman-Jensen et al., 2014). Some households' income may be so low that they cannot afford enough food, but if this was the only explanation for food insecurity, we would expect food insecurity to *only* be a problem of the very poor and that food insecurity would affect a larger proportion of the very poor. One possibility is that financial literacy, not just low income, contributes to food insecurity.

Food insecurity is typically defined as not having consistent access to adequate food for active, healthy lives for all household members. Food insecurity may have an impact on health and well-being, as summarized in Gunderson, Kreider, and Pepper (2011), although much of the literature focuses on studying correlations rather than causal effects. At is core, food insecurity is a financial constraint, not a constraint related to food safety. Food insecurity may manifest with a switch to less costly food or reduced total consumption of food for some or all household members; at its most extreme individuals will go without food for an entire day or days. Regardless of household income, those who fail to smooth

Corresponding author Zamarro: gzamarro@uark.edu; Tel: (479) 575-7024.

spending between pay periods and who lack access to credit may struggle to ingest adequate food intakes throughout the month (Zaki, 2014). Among food stamp recipients there is evidence that many fail to smooth consumption over the month (Shapiro 2005); Hastings and Washington 2010), suggesting that policies designed to reduce food insecurity only by providing additional income may not be sufficient.

Even high income households can experience food insecurity if income is uneven throughout the year (Nord and Brent, 2002; Gunderson and Gruber, 2001). Furthermore, Gunderson et al. (2011) find that unemployment is a strong predictor of food insecurity. However, those with higher degrees of financial literacy might be more likely to hold savings that could protect them from this instability and help them avoid food insecurity. More generally, financial literacy may help to explain other sources of heterogeneity in who experiences food insecurity. Heterogeneity may arise if households cope differently with changes in the price of food (Caracciolo and Santeramo, 2013; D'Souza and Jolliffe, 2012; Santeramo and Khan, 2015).

Financial literacy may provide a key to understanding which households experience food insecurity. Household financial literacy and behavior indicators have been shown to contribute to family wealth and well-being. We measure financial literacy based on a standard battery of questions designed to measure a consumer's knowledge of basic financial concepts. Recent research suggests that indicators of financial knowledge and financial behavior are related to higher retirement savings (Lusardi and Mitchell, 2007), family wealth (Behrman et al., 2012) and better current-cost/current-benefit tradeoff decisions (Carlin and Robinson, 2010). Those with higher degrees of financial literacy face less difficulty in making financial decisions which manifests in a greater ability to budget or save to create a buffer. This could play a key role in understanding why income alone does not explain food insecurity.

However, to our knowledge, there has been no systematic research that would allow a better understanding of the impact of household financial literacy on the prevalence of food insecurity. This is probably because measures of food insecurity as well as indicators of financial literacy are seldom found together in datasets. To address this gap in the literature we collected data on a nationally representative sample of Americans about both food security and financial literacy.

As stated above, food insecurity is usually defined as not having consistent access to adequate food for active, healthy lives for all household members. However, food insecurity may manifest with a switch to less costly lower quality food, as opposed to reduced total consumption of food. We fielded a survey that included questions to capture these two different dimensions of food insecurity as well as questions to build measures of financial literacy. Finally, we also have detailed information on household and individual characteristics, including measures of cognitive ability and information on the use of food stamps and other relevant welfare programs, which we use in our analysis.

2. Methodology

Data

The main data source for this research comes from a survey module we collected in the RAND American Life Panel (ALP). The ALP is a nationally representative Internet panel of respondents 18 and older who agreed to participate in occasional online surveys. Respondents were recruited using a nationally representative sampling frame and they do not need Internet access to participate; those without access are provided access, eliminating the bias found in many Internet surveys which include only computer users. Upon joining the panel, respondents complete an initial survey collecting individual socio-demographic information, work history and household composition information. They are also asked to update their background information each time they log in to respond to a module. Roughly once a month, respondents receive an e-mail with a request to fill out a questionnaire. Response rates average 70%–80%. Since 2006, the ALP has included over 420 surveys on a wide range of topics (e.g., subjective probabilities and expectations (Delavande and Rohwedder, 2008; Manski and Molinari, 2010), financial planning (Binswanger and Carman, 2012); health insurance (Carman, Eibner, and Paddock, 2015), and financial literacy (Bruine de Bruin et al., 2010; Lusardi and Mitchell, 2007; Fonseca et al., 2012).[1]

Our results are based on a survey module designed by the research team to better understand the relationship between food insecurity, household income and financial literacy.[2] Data was collected from 2,284 respondents in a survey that was fielded between March and May 2014. Tthis survey was fielded to households who had annual family income below $50,000 since this is the population for which food insecurity is most prevalent. Our designed module included detailed food insecurity questions, questions about participation on relevant supplemental income and welfare programs, as well as questions used to build financial literacy measures.

A key feature of the panel structure of the ALP survey is the possibility to link data from our survey to other surveys, developed and collected by other researchers. In this paper we use this unique feature and linked our collected data to a module fielded between September of 2012 and May 2013 that included cognitive ability measures.

Sample weights were calculated to make the distributions of age, gender, race/ethnicity, education, income and household size approximate the distributions in the Current Population Survey (CPS), within the same income range included in the survey, and to increase the generalizability of the results. We describe below the construction of the main variables used in the analysis.

Food Insecurity Measures

There are a number of different ways to measure food security. In this paper we focus on a measure of food access and stability. According to the taxonomy described in Carletto,

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[1]Further information about the ALP is available at http://alpdata.rand.org
[2]All the data used for this paper are freely available at https://alpdata.rand.org/index.php?page=data&p=showsurvey&syid=374, under "Well Being 374."

Zezza, and Banerjee (2013), food access relates to household's ability to "acquire appropriate foods for a nutritious diet" while food stability relates to access even when faced with shocks. Our survey questions related to food insecurity include those developed by the U.S Department of Agriculture and that are collected in an annual food security survey, conducted by the U.S. Census Bureau as a supplement to the nationally representative Current Population Survey. While other measure of food security have been used in the literature (for example, Maxwell et al., 2003; Coates, Swindale and Bilinsky, 2007; Pangaribowo, Gerber, and Torero, 2013; Santeramo, 2015a and 2015b), use of this measure of food insecurity makes our data more comparable to other data collected in the United States. In particular we included 18 item questions, derived from the Core Food Security Module (CFSM)[3], designed with the aim to capture food insecurity by asking respondents to report on a series of conditions and behaviors designed to characterize households that are having difficulty meeting basic food needs. Further information about the CSFM is available in Hamilton et al. (1997). Each question asks whether a certain condition or behavior occurred at any time during the previous 12 months and specifies a lack of money and other resources to obtain food as the reason for its occurrence. In particular, there are 10 questions about the food conditions of the respondent or other adult members of the household and a total of 8 additional questions capturing food conditions of children in the household, if present.

The food security status of each interviewed respondent's household is determined by the number of food-insecure conditions and behaviors the respondent reports. In particular, the first three questions of the questionnaire capture worries that food would not last and difficulties affording enough food and a balanced diet. Respondents can indicate whether these conditions happened more or less frequently choosing among the following 3-point response scale: "Often", "Sometimes", or "Never". Respondents in households where there are no children present are then classified as food secure if they do not report that they or any other adult in the household presented any of these three food-insecure conditions, where a food-insecure condition is identified as a response of "often" or "sometimes" for a given situation or behavior. Similarly, respondents in households with children are classified as food secure if neither the respondent, any other adults in the household, nor the children in the household presented any of these three food-insecurity conditions. Respondents are classified as being at risk of food insecurity if anyone in their household presented some food-insecure conditions but not more than two. Finally, a respondent's household is classified as being food insecure if the respondent reported having experienced three or more food-insecure conditions.

Respondents in food insecure households are asked 7 additional questions, 12 if children are present in the household. These questions are then used to further classify respondents as being in a very low food insecure household if they report to have experienced three or more symptoms of adjustments to food intake, or 5 or more for households with children, due to lack of resources. Respondents in a low food insecure household are those among the food insecure who reported to have experienced less than three symptoms of adjustments to food

intake, or less than 5 symptoms of adjustments in the case of households where kids are present. Table 1 summarizes how households were classified and reports the number of observations and share of the total sample that were observed in each category in our collected sample.

In addition, our module included two additional questions that we developed to capture undesired changes in healthy diet due to lack of resources. Even households that are able to avoid hunger, may experience periods where due to financial constraints they are forced to reduce consumption of certain healthy foods. These measures are similar to those discussed by Pangaribowo, Gerber, and Torero (2013) in relation to measures of nutrition security. In particular, according to this alternative classification we consider a respondent to be in a food insecure household if they report that either him or any other adult in the household, or children in the household if present, "often" or "sometimes" during the previous year, did not buy fruit or vegetables because of lack of funds or had to buy more low cost fast foods because of lack of funds. This alternative measure of food insecurity allows us to capture households that experience a less severe form of food insecurity, while they may not experience hunger, they are not able to maintain the diet that they would prefer due to financial limitations.

Financial Literacy Measures

Financial literacy was measured using ten questions that assessed knowledge about inflation, interest rates, compound interest, returns versus risk and diversification. In particular, our financial literacy questions included eight questions as developed by OECD (2013), developed to better measure financial literacy among respondents of different countries and socio-economic backgrounds, and two additional questions on the concepts of interest rates and inflation and mutual funds as developed by Lusardi and Mitchell (2006)[4]. The responses to these financial literacy questions are then combined in a simple index taking values from 0 to 10 capturing the number of correct answers to these questions.

Other Relevant Information Available for our Analysis

Other relevant socio-demographic information of the respondent and his household, including age, gender, ethnic/race, household income expressed as percentage of the FPL given household composition, respondent's work status and respondent's education is also available and included in our analysis. In addition, our module also included five questions capturing whether anyone in the household participated in the following programs: a Supplemental Nutrition Assistance Program (SNAP) (during the last 12 months), free or reduced price lunches program in schools (during the last 30 days), free or reduced price breakfast program in schools (during the last 30 days), reduced-cost food at a day-care or Head Start program (during the last 30 days), or the WIC program (during the last 30 days). This latter information is summarized in three variables capturing participation to a SNAP program, participation to the WIC program, and participation on a nutrition program directed to the children in the household (i.e. free or reduced price lunches in school, reduced-cost food at a day-care or Head Start program, or reduced price breakfast program).

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[4]See Appendix A for the detailed questions about financial literacy included in the survey.

Finally, as explained above, we merged our collected survey data with information on cognitive ability from a previous survey to perform robustness checks of our results. The cognitive ability measures were derived from computer-adaptive tests, based on nationally normed but unpublished items from several tests fielded as part of the Woodcock-Johnson III (WJ-III) battery of cognitive ability tests (Woodcock, McGrew, and Mather, 2001). In particular, this module included measures of math reasoning through a numerical series task, measures of crystallized cognitive abilities through a picture vocabulary test where respondents are asked to name a series of objects in pictures, and a measure of fluid and crystallized cognitive abilities through a verbal analogy task. Test scores for each task are provided in W-scores, normed to the population. Thus, higher W scores are indication of greater levels of cognitive ability. Test scores are centered at 500 and have a standard deviation of about 10.[5] Although not all respondents in our collected data also completed the cognitive ability measures we are able to match a sample of 1,871 (81 % of the original sample) respondents that we use in robustness tests in our analysis.

Methods

Using the data we collected, described above, we analyzed the relationship between the incidence of food insecurity and respondent's financial literacy. Our estimates are derived from slight variations of the following empirical model:

$$Y^* = \beta_0 + \beta_1 X_i + \beta_2 Financial\_Literacy_i + \gamma_i^S + \varepsilon_i$$

Where Y^* is the underlying measure determining that a household is classified as food insecure ($Y^* > 0$), using alternative definitions. β_2 is the coefficient of interest representing the association between respondent's financial literacy and food insecurity. χ_i includes relevant socio-economic background information such as age, gender, ethnicity, eight dummies representing different centiles indicating a household's position in the income distribution expressed as a percentage of the FPL, education level (less than high school (reference category), high school graduate, some college, college Associate degree, and college Bachelor degree), work status (employed (reference category), unemployed, disabled, retired and housework or other), marital status (married (reference category), divorce or separated, widow, or never married), whether there are children living in the household, whether anyone in the household participates in the SNAP program, WIC program, or a nutrition program for children (free or reduced price lunch at school, reduced-cost food at a day-care or Head Start program, or reduced price breakfast program). Finally, our specification also controls for state of residence fixed effects collected in γ_i^S as a means of controlling for any unobserved differences across states, particularly in terms of eligibility for assistance program.

For our analysis, we first study the determinants of the incidence of food insecurity using a probit model where the dependent variable is an indicator for being classified as a food insecure household, according to the CFSM questions or according to our additional

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[5]For more detail on the cognitive measures available to us in this survey see (Parker et al., 2013).

measure of food insecurity where households change their diet towards less healthy options because of lack of resources. Secondly, we study the determinants of the intensity of food insecurity by defining a categorical variable that takes value 0 if the household is found to be food secure, value 1 if the household is found to be at risk of food security, value 2 if the household is classified as low food insecure, and value 3 if it is classified as very low food insecure. We then estimated an ordered probit models to study the determinants of presenting lower levels of food security.

3. Results

This section presents the results of our analysis of the relationship between food security and financial literacy. The section first presents descriptive statistics for the sample at hand followed by our results of the empirical model presented in the previous section.

Descriptive Statistics

Table 2 presents descriptive statistics for our analysis sample both overall and by food insecurity status based on responses to the CFSM questions. Our analysis focuses on households with total income below $50,000 which leads with 2,284 respondents in our sample with around half of the sample being men and half of the sample being female. The overall average household income is of about 150 percent of the FPL, as expected higher for food secure and at risk households (172 percent) than for food insecure households (111 percent). The average age of the respondents was 48 years with those in food insecure household being younger on average than those in food secure or at risk households. Respondents in food insecure households are more likely to be unemployment or disabled respondents than those in food secure or at risk households. In contrast, the proportion of retired respondents is higher among those in food secure or at risk households. Food insecure households have more respondents that are divorced, separated, or never married than food secure or at risk households. Average household size in the sample is around 2 members but children are found more often in households that are classified as food insecure. Participation in food assistance programs is reported to be relatively low in our sample with the highest participation being that of the SNAP program with an average of 27 percent of the sample. However, participation rates are reported to be higher among food insecure households than among food secure or at risk households. About 40 percent of our sample reports having a high school diploma as their highest education while another 40 percent reports having some college experience. Finally, on average respondents responded correctly to 6 out of the 10 financial literacy questions with a difference of 1 question less answered correctly for those in food insecure households as compared to those in food secure or at risk households.

Figure 1 presents the distribution of food insecurity status based on both the CFSM questions, as well as based on whether household members changed the diet to cope with a lack of resources, as a function of household income expressed as a percentage of the FPL. As previously found in the literature, we also find that household income is not a perfect predictor of food insecurity status. The proportion of households classified as food insecure according to the CFSM questions remains at around 50 percent for households with incomes

in the bottom four centiles of the distribution and this proportion does not begin a sharp decline until the top four quartiles of the distribution. Even then, the proportion of food insecure households remains at about 20 percent among those respondents with household family incomes in the top of the distribution. A similar pattern is observed when we study changes in diet due to lack of resources although the incidence in this case is higher. The proportion of households reporting having changed their diet towards less healthy options due to the lack of resources in the last year is about 75 percent for the first four centiles of the household income distribution. This proportion declines slightly to about 50 percent for those with higher levels of household income in our sample.

Finally, Figure 2 studies the intensity of food insecurity among those who are classified as food insecure or at risk according to the CFSM questions, as a function of household income. In this case, we observe that around 50 percent of the food insecure or at risk households in the first three centiles of the household income distribution are classified as very low food insecure. In contrast, 30 percent of the households in this group are only classified as at risk, with the remaining 20 percent presenting low food insecurity. On the opposite end of the household distribution we observe that a majority of households (around 60 percent) are classified as at risk. However, the proportion of households classified as very low food security does not fall beyond 20 percent even in the top end of the household distribution in our data.

Both of these figures suggest that income only partially explains food insecurity. The fact that many in the higher income groups experience food insecurity suggest that it is important to consider multivariate analysis to better understand heterogeneities in who experiences food insecurity. In the next sections we present the results of our study of potential factors beyond household income that could contribute to both being classified as a food insecure household as well as the intensity of food insecurity. In particular, we study the role that financial literacy might have on explaining the patters described in this section.

Determinants of the incidence of food insecurity

Table 3 presents marginal effects of probit models estimates explaining the probability of being classified as food insecure both by means of responses to the CFSM questions, as well as depending on whether the respondent reported changes in the family's eating habits towards a less healthy diet. As we can see in this table financial literacy is found to be negatively related to the probability of being classified as a food insecure household by both measures, but only statistically significant for the case of food insecurity based on CFSM questions. In particular, each additional correct financial literacy question is found to be linked to a reduction of the probability of being a food insecure household of 2 percent. Interestingly, for both measures of food insecurity, we fail to find consistent significant effects of household income until we move to the top 2 centiles of the distribution (i.e. household income levels between 200 and 386 percent of the FPL). Moving to the top centiles of the distribution of household income in our sample reduces the probability of being classified as a food insecure household between 10 and 27 percent, depending on the centile and the definition of food insecurity.

The estimated effects for the socio-demographic controls included in the model have the expected signs and are in line with previously found results in the literature. In particular, we find that Hispanic or Latino households have a higher probability of experiencing food insecurity, but only marginally significant for measures of food insecurity based on the CFSM questions. Retirement is associated with lower levels of food insecurity regardless of the measure used, while housework or other labor status has a positive effect on food security only for measures based on the CFSM questions. Similarly, households with children present a higher probability of being classified as food insecure but only for the traditional measure of food insecurity. Because our measure of income accounts for household size, our regressions already control for household size, thus this is an effect of household composition. Divorced or separated respondents present a higher probability of suffering food insecurity regardless of the measure used. SNAP program participants tend to report they change their diet towards less healthy options with a higher probability. Education appears to have a protective effect for food insecurity but the effect is only marginally significant for those with a bachelor degree. Finally, it should be pointed out that in general we tend to find lower effects of variables when studying the probability of reporting having changed the diet to less healthy options due to lack of resources. Our results then suggest that this could be a common behavior among low income families to try and cope with lack of resources that is difficultly explained by the socio-economic variables included in our model.

In addition, we also studied whether the estimated effects for the determinants of the probability of being classified as food insecure both by means of responses to the CFSM questions varied by respondent's educational level. Table 4 presents marginal effects of probit models estimates separately for respondents whose highest level of education is high school and those who had a college degree (associate or bachelor degree). Interestingly we found that the estimated effect of financial literacy was not driven by respondents with higher completed levels of education but in fact, it estimated to be higher among those with only a high school diploma. For those with only a high school degree, each additional correct question in the financial literacy test is associated with a 2 percentage point reduction in the probability of being food insecure, and the coefficient is significant. The associated reduction of probability for those holding a college degree was only 1 percent and the estimated effect turned out to be insignificant.

Determinants of the intensity of food insecurity

Table 5 presents estimated coefficients from an ordered probit model where the dependent variable takes 0 to 3 for the categories food secure, at risk, low food security, and very low food security, as explained above in the Methods section. The aim of these estimates is to study the determinants of the degree of intensity of food insecurity across households. Also in this case we find that financial literacy has a protective effect as it is associated with less acute levels of food insecurity. However, household income presents the most protective effect but it is only significant from the 5th centile onwards (household income levels between 134.5 and 386 percent of the FPL). To compare the magnitude of the effects of these two sets of variables, Table 6 presents marginal effects of the estimated ordered probit model for the probability of being classified as at risk of food insecurity, having low food

security, and having very low food security. Looking at the results in this table we observe that the protective effects of both financial literacy and income are only significant predictors of being classified as a low or a very low food secure household. Income and financial literacy are not significant predictors of being classified as at risk of food insecurity. Finally, these variables have the highest protective effect on reducing the probability of being classified as a very low food secure household. Each additional correct answer to the financial literacy questions is associated with a reduction on the probability of being classified as a very low food secure household of 1.2 percent. In contrast, moving to the top centiles of the household income composition is associated with a reduction of up to 17 percent.

Returning to the estimated effects presented in Table 5 we observe that the coefficients of the socio-economic and demographic variables are all in the expected direction. Hispanic / Latino households have a greater likelihood of more acute levels of food insecurity. Retired respondents, those doing house work or other labor experience lower levels of food insecurity. In contrast, divorced and separated respondents or those with children in the household are more likely to exhibit more severe levels of food insecurity. Similarly, families participating on the SNAP program are more likely to experience more severe food insecurity.

Robustness check: Financial literacy versus cognitive ability

Our estimated specifications included detailed controls for education and that should control to some extent for cognitive ability differences across respondents. However it is possible that our measures of financial literacy pick up the impact of cognitive differences on food security. Cognitive differences within a given educational level that are correlated with our financial literacy measures could potentially explain the estimated significant effects. To test if this is the case, we used data from a previous survey in the ALP that included computer-adaptive tests measures of cognitive ability. This allowed us to control for respondent's cognitive ability with three variables capturing results on cognitive tests including Number series, Picture vocabulary, and Verbal analogies.

Our measures of cognitive ability were moderately correlation with the financial literacy measure, on the order of around 0.3 for all three cognitive measures. However, the regression results did not change substantially when controls for cognitive ability were included. Table 7 replicates the results from table 3 but controls for cognitive ability. The estimated effect of financial literacy is reduced by 0.1 percentage points only and remains statistically significant. Similar results were obtained for the analysis of the determinants of the intensity of food insecurity[6].

4. Further Discussion and Conclusions

Food insecurity occurs when households lack the resources to avoid hunger. However, it is not limited to only those households at the very bottom of the income distribution. Our research suggests that food insecurity is not only a result of having insufficient income, but

[6]Estimates for this case are available from the authors upon request.

also of lacking financially capability. Households that lack knowledge of basic financial concepts are more likely to experience food insecurity. This is particularly the case for those with lower levels of education. Financial literacy may be particularly important in helping low income households cope with their limited resources. If this is the case finding ways to help household better understand and manage their finances may help them to avoid food insecurity. Our robustness test shows that the estimated positive relationship between financial literacy and food security is not only due to differences in cognitive ability. Financial literacy may be a marker for other non-cognitive skills that help households maintain food security. Future research should seek to better understand the underlying mechanisms of the association found here.

Policies that are intended to address food insecurity must attack the root causes of food insecurity and this research suggests that having more financial resources is not sufficient to avoid food insecurity. Thus programs that seek to supplement income, such as SNAP, or provide access to food, such as WIC and nutrition programs for children, may not be sufficient to prevent food insecurity. Understanding how other skills such as financial literacy and financial capability more broadly are developed among low-educated low-income households and how they contribute to food insecurity will help to better design programs to combat food insecurity.

Acknowledgments

APPENDIX A: FINANCIAL LITERACY QUESTIONS

This appendix describes the financial literacy questions in our ALP questionnaire. Details on the whole questionnaire can be found at https://alpdata.rand.org/?page=data, under "Well Being 374." The correct answer to each question is indicated by a *.

Question 1 division test

The next part of the questionnaire is more like a quiz. The questions are not designed to catch you out, so if you think you have the right answer, you probably do. If you don't know the answer, just skip the question by clicking "Next" until you get to the next question, or click "Don't know. " Imagine that 5 brothers are given a gift of $1,000. If the brothers have to share the money equally how much does each one get? [Correct response $200]

Question 2 inflation test

Now imagine that the brothers have to wait for one year to get their share of the $1,000 and inflation stays at 2 percent. In one year's time will they be able to buy:

  1 More with their share of the money than they could today

  2 The same amount

  *3 Less than they could buy today

4 It depends on the type of things that they want to buy

9 Don't know

Question 3 loan interest test

Suppose you lend $25 to a friend one evening and he gives you $25 back the next day. How much interest has he paid on this loan? [Correct answer 0]

Question 4 savings account interest test

Suppose you put $100 into a savings account with a guaranteed interest rate of 2 percent per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made? [Correct answer $102]

Question 5 five years later savings account interest test

. . . and how much would be in the account at the end of five years? [Correct answer $110]

Question 6 true false high return is high risk

Please indicate whether you think the following statements are true or false: An investment with a high return is likely to be high risk. In other words, if someone offers you the chance to make a lot of money there is also a chance that you will lose a lot of money

*1 True

2 False

3 Don't know

Question 7 true false high inflation

High inflation means that the cost of living is increasing rapidly.

*1 True

2 False

3 Don't know

Question 8 true false diversification

It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares. In other words, it is less likely that you will lose all of your money if you save it in more than one place.

*1 True

2 False

3 Don't know

Question 9 interest 1 percent inflation 2 percent test

Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?

1 More than today

2 Exactly the same as today

*3 Less than today

9 Do not know

Question 10 single stock vs mutual fund test

Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund."

1 True

*2 False

3 Don't know

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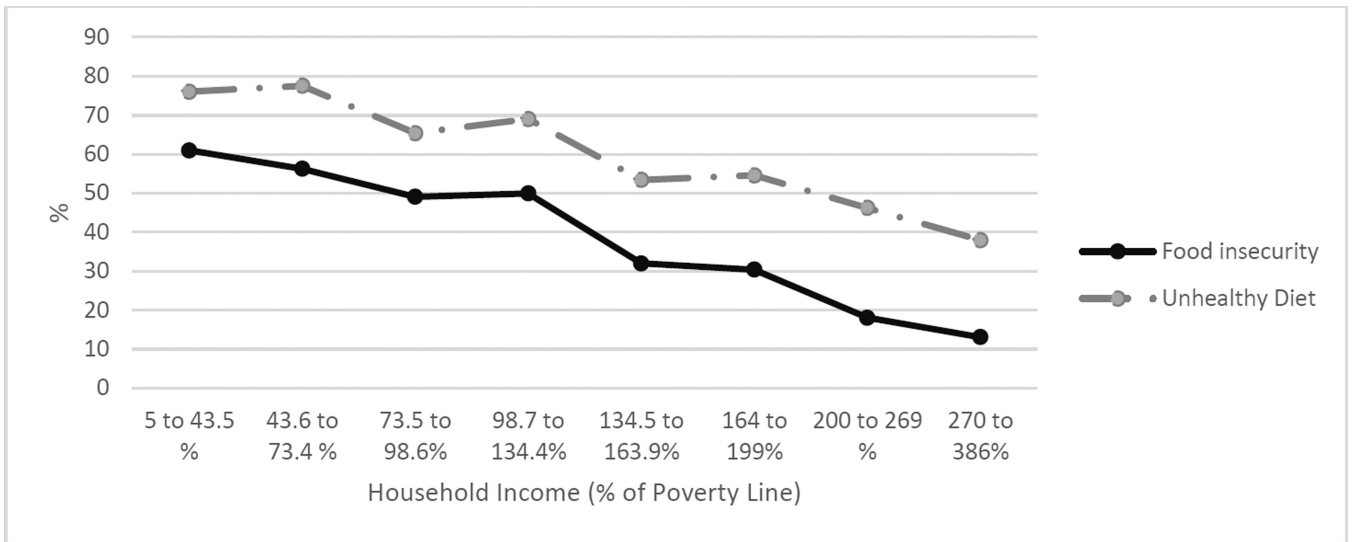
Figure 1.
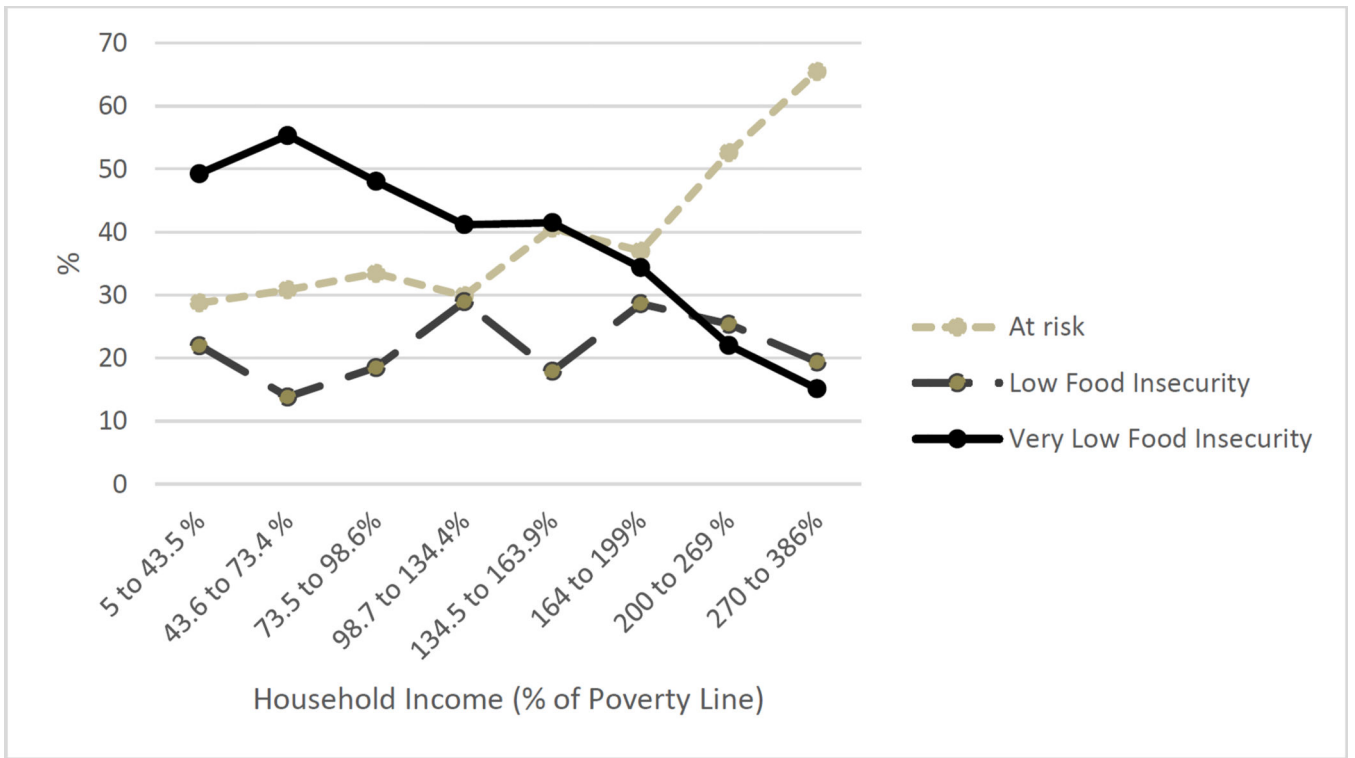Food Insecurity Status and Household Income (% of the Federal Poverty Level)

Figure 2.
Food Insecurity Intensity and Household Income (% of the Federal Poverty Level)

Table 1

Food Security Measures. Description and Summary Statistics

Group	Definition	N. Obs (% of Total Sample)
Food Secure	Answered Never for first 3 questions about having difficulties to afford food	856 (37.48%)
At risk for food insecurity	Answered "Sometimes" or "Often" for 1 or 2 of the first 3 questions about having difficulties to afford food	511 (22.37%)
Food Insecure	Answered "Sometimes" or "Often" to all of the first 3 questions about having difficulties to afford food	917 (40.15%)
Low Food Insecurity	Answered "Sometimes" or "Often" for all 3 of first 3 questions about having difficulty to afford food, and reported 2 or fewer (4 or fewer in households with children) changes in amount of food intake in additional questions	274 (12.00%)
Very Low Food Insecurity	Answered "Sometimes" or "Often" for all 3 of first 3 questions about having difficulty to afford food, and reported 3 or more (5 or more in households with children) changes in amount of food intake in additional questions	643 (28.15%)
Total		2,284 (100.00%)
Changes in healthy diet	Answered "often" or "sometimes" for at least one question out of 2 questions, 4 if children are present in household, related to changes in the quality of food intake	1,347 (58.98%)

Table 2

Sample Descriptive Statistics. Overall and by Food Insecurity Status

	Overall		Food Secure + At Risk				Food Insecure	
	Mean	*SD*	*Mean*	*SD*		*Mean*	*SD*	
Financial Literacy	**6.42**	**2.45**	**6.86**	**2.38**		**5.69**	**2.38**	
Household Income % Poverty Line	149.41	89.13	172.43	89.74		110.98	73.53	
Household Size	2.39	1.54	1.58	1.54		2.15	1.89	
Male	0.46	0.50	0.48	0.50		0.44	0.50	
Age	47.99	18.16	50.49	19.31		43.81	15.16	
Hispanic/Latino	0.23	0.42	0.18	0.38		0.33	0.47	
African American	0.16	0.36	0.13	0.33		0.21	0.41	
Unemployed	0.13	0.33	0.09	0.29		0.18	0.39	
Disabled	0.11	0.31	0.08	0.27		0.16	0.37	
Retired	0.21	0.41	0.28	0.45		0.11	0.31	
Housework or Other Work Status	0.08	0.27	0.08	0.27		0.08	0.27	
Divorce/Separated	0.22	0.41	0.20	0.40		0.25	0.43	
Widowed	0.08	0.27	0.10	0.30		0.05	0.23	
Never Married	0.29	0.46	0.28	0.45		0.31	0.46	
Children in Household	0.29	0.46	0.20	0.40		0.44	0.50	
SNAP participant	0.27	0.44	0.19	0.39		0.40	0.49	
WIC participant	0.06	0.23	0.03	0.17		0.10	0.30	
Children in Nutrition Program	0.18	0.38	0.10	0.31		0.29	0.46	
High School Graduate	0.43	0.49	0.43	0.50		0.42	0.49	
Some College	0.19	0.40	0.19	0.39		0.20	0.40	
Associate Degree	0.08	0.28	0.09	0.28		0.08	0.27	
Bachelor Degree	0.15	0.36	0.19	0.39		0.09	0.29	
N. obs	2,284		1,367			917		

Notes: Authors' calculations using ALP data, survey 374. Sample restricted to families with less than 50K in annual income. Weighted summary statistics using sample weights.

Table 3

Determinants of Household Food Insecurity Status. Probit Model Estimates (Marginal Effects)

VARIABLES	Food Insecure	Worse Diet	VARIABLES	Food Insecure	Worse Diet
Financial Literacy	**-0.0163*** (0.0058)**	**-0.0081 (0.0066)**	Retired	-0.1288*** (0.0407)	-0.1655*** (0.0423)
Household Income %PL-C2	-0.0352 (0.0481)	0.0192 (0.0551)	Housework or Other Work Status	-0.1094** (0.0443)	-0.0574 (0.0509)
Household Income %PL-C3	-0.05 (0.0466)	-0.0601 (0.0533)	Divorce/Separated	0.0780** (0.0308)	0.1040*** (0.0329)
Household Income %PL-C4	0.0007 (0.0491)	0.0120 (0.0559)	Widowed	-0.0426 (0.0470)	0.0616 (0.0521)
Household Income %PL-C5	-0.1226** (0.0513)	-0.0817 (0.0614)	Never Married	0.0089 (0.0334)	0.0285 (0.0362)
Household Income %PL-C6	-0.0984 (0.0606)	-0.0517 (0.0628)	Children in Household	0.0836** (0.0388)	0.0306 (0.0437)
Household Income %PL-C7	-0.2066*** (0.0565)	-0.1049* (0.0611)	SNAP participant	0.0503 (0.0322)	0.0950*** (0.0350)
Household Income %PL-C8	-0.2734*** (0.0622)	-0.1879*** (0.0664)	WIC participant	0.0197 (0.0458)	0.0570 (0.0560)
Male	-0.0306 (0.0253)	0.0062 (0.0276)	Children in Nutrition Program	0.0516 (0.0404)	0.0236 (0.0460)
Age	0.0008 (0.0011)	-0.0000 (0.0012)	High School Graduate	-0.0545 (0.0404)	-0.0496 (0.0491)
Hispanic/Latino	0.0655* (0.0332)	0.0238 (0.0363)	Some College	-0.0132 (0.0411)	-0.0888 (0.0494)
African American	0.0417 (0.0383)	0.0063 (0.0402)	Associate Degree	0.0085 (0.0471)	-0.0722 (0.0552)
Unemployed	0.0321 (0.0395)	0.0379 (0.0477)	Bachelor Degree	-0.0890* (0.0455)	-0.0943* (0.0544)
Disabled	0.0583 (0.0480)	0.0549 (0.0491)			

Notes: Authors' calculations using ALP data, survey 374. Sample restricted to families with less than 50K in annual income. Number of observations: 2284.

***
p<0.01,

**
p<0.05,

*
p<0.1.

State of residence dummies also included in the model. Weighted estimates using sample weights.

Table 4

Determinants of Household Food Insecurity Status by Education Level. Probit Model Estimates (Marginal Effects)

VARIABLES	College	High School	VARIABLES	College	High School
Financial Literacy	**−0.0124** **(0.0081)**	**−0.0180*** **(0.0069)**	Disabled	0.1481** (0.0581)	0.0399 (0.0564)
Household Income %PL-C2	0.2106** (0.0814)	−0.0625 (0.0541)	Retired	−0.0896* (0.0522)	−0.1474*** (0.0506)
Household Income %PL-C3	0.0549 (0.0753)	−0.0686 (0.0530)	Housework or Other Work Status	−0.0068 (0.0655)	−0.1503*** (0.0529)
Household Income %PL-C4	0.0985 (0.0748)	−0.0162 (0.0572)	Divorce/Separated	0.1312*** (0.0403)	0.0637* (0.0380)
Household Income %PL-C5	0.0142 (0.0747)	−0.1584** (0.0618)	Widowed	0.0829 (0.0784)	−0.0647 (0.0549)
Household Income %PL-C6	−0.0200 (0.0748)	−0.1248 (0.0759)	Never Married	0.0047 (0.0402)	0.0183 (0.0418)
Household Income %PL-C7	−0.0549 (0.0833)	−0.2531*** (0.0684)	Children in Household	0.1712 (0.0439)	0.0425 (0.0488)
Household Income %PL-C8	−0.1050 (0.0856)	−0.3030*** (0.0792)	SNAP participant	0.0773* (0.0411)	0.0314 (0.0384)
Male	−0.0256 (0.0334)	−0.0401 (0.0306)	WIC participant	−0.2571*** (0.0724)	0.0796 (0.0544)
Age	−0.0011 (0.0014)	0.0012 (0.0014)	Children in Nutrition Program	−0.0145 (0.0524)	0.0853* (0.0495)
Hispanic/Latino	0.0326 (0.0423)	0.0789* (0.0408)	High School Degree		−0.054 (0.0416)
African American	0.0329 (0.0516)	0.0460 (0.0476)	Some College		−0.0085 (0.0431)
Unemployed	0.1253** (0.0507)	−0.0002 (0.0485)	Bachelor Degree	−0.0643** (0.0310)	

Notes: Authors' calculations using ALP data, survey 374. Sample restricted to families with less than 50K in annual income. Number of observations: 2284.

***
   p<0.01,

**
   p<0.05,

*
   p<0.1.

State of residence dummies also included in the model. Weighted estimates using sample weights.

Table 5

Determinants of Household's Food Insecurity Intensity. Ordered Probit Model Estimates

VARIABLES	Food Insecurity Intensity	VARIABLES	Food Insecurity Intensity
Financial Literacy	**−0.0458*** (0.0163)**	Housework or Other Work Status	−0.438*** (0.125)
Household Income %PL-C2	−0.0233 (0.136)	Divorce/Separated	0.298*** (0.0874)
Household Income %PL-C3	−0.0920 (0.128)	Widowed	0.00474 (0.127)
Household Income %PL-C4	−0.0632 (0.132)	Never Married	0.0809 (0.0940)
Household Income %PL-C5	−0.338** (0.135)	Children in Household	0.365*** (0.117)
Household Income %PL-C6	−0.331** (0.161)	SNAP participant	0.318*** (0.0878)
Household Income %PL-C7	−0.604*** (0.149)	WIC participant	−0.00652 (0.135)
Household Income %PL-C8	−0.682*** (0.161)	Children in Nutrition Program	0.0813 (0.122)
Male	−0.111 (0.0684)	High School Graduate	−0.251** (0.111)
Age	0.00109 (0.00315)	Some College	−0.114 (0.114)
Hispanic/Latino	0.228** (0.0899)	Associate Degree	−0.0919 (0.131)
African American	0.173 (0.106)	Bachelor Degree	−0.235* (0.125)
Unemployed	0.0799 (0.106)	Constant cut1	−0.305 (0.409)
Disabled	0.161 (0.124)	Constant cut2	0.402 (0.409)
Retired	−0.562*** (0.114)	Constant cut3	0.855** (0.408)

Notes: Authors' calculations using ALP data, survey 374. Sample restricted to families with less than 50K in annual income. Number of observations: 2284.

***
p<0.01,

**
p<0.05,

*
p<0.1.

State of residence dummies also included in the model. Weighted estimates using sample weights.

Table 6

Determinants of Household's Food Insecurity Intensity. Ordered Probit Marginal Effects

	Pr(At Risk)	Pr(Low Food Security)	Pr(Very Low Food Security)
Financial Literacy	**−0.0003** **(0.0003)**	**−0.0023***** **(0.0008)**	**−0.0116***** **(0.0041)**
Household Income %PL-C2	−0.0002 (0.0010)	−0.0011 (0.0067)	−0.0059 (0.0344)
Household Income %PL-C3	−0.0007 (0.0011)	−0.0045 (0.0063)	−0.0223 (0.0324)
Household Income %PL-C4	−0.0004 (0.0010)	−0.0031 (0.0065)	−0.0160 (0.0333)
Household Income %PL-C5	−0.0024 (0.0022)	−0.0167** (0.0068)	−0.0856** (0.0340)
Household Income %PL-C6	−0.0024 (0.0023)	−0.0164** (0.0080)	−0.0840** (0.0404)
Household Income %PL-C7	−0.0043 (0.0035)	−0.030*** (0.0074)	−0.1530*** (0.0373)
Household Income %PL-C8	−0.0050 (0.0040)	−0.0343*** (0.0082)	−0.1727*** (0.0406)

Notes: Authors' calculations using ALP data, survey 374. Sample restricted to families with less than 50K in annual income. Number of observations: 2284.

*** p<0.01,

** p<0.05,

* p<0.1

Table 7

Determinants of Household Food Insecurity Status. Controlling for Cognitive Ability. Probit Estimates (Marginal Effects)

VARIABLES	Food Insecure	Worse Diet	VARIABLES	Food Insecure	Worse Diet
Financial Literacy	**-0.0154**** (**0.0064**)	**-0.0085** (0.0075)	Housework or Other Work Status	-0.0879* (0.0455)	-0.0127 (0.0533)
Household Income %PL-C2	-0.01203 (0.0555)	0.0130 (0.0662)	Divorce/Separated	0.0703** (0.0330)	0.0804** (0.0378)
Household Income %PL-C3	-0.0502 (0.0541)	-0.0810 (0.0625)	Widowed	-0.0325 (0.0488)	0.0826 (0.0568)
Household Income %PL-C4	0.0074 (0.0560)	-0.0180 (0.0647)	Never Married	-0.0190 (0.0360)	0.0039 (0.0410)
Household Income %PL-C5	-0.1238** (0.0581)	-0.1064 (0.0702)	Children in Household	0.0663 (0.0418)	0.0194 (0.0483)
Household Income %PL-C6	-0.0843 (0.0628)	-0.0481 (0.0698)	SNAP participant	0.0736** (0.0342)	0.0881** (0.0365)
Household Income %PL-C7	-0.1801*** (0.0634)	-0.1220* (0.0714)	WIC participant	0.0155 (0.0518)	0.0531 (0.0670)
Household Income %PL-C8	-0.2599*** (0.0689)	-0.2104*** (0.0733)	Children in Nutrition Program	0.0296 (0.0440)	0.0279 (0.0523)
Male	-0.0466* (0.0269)	0.0004 (0.0306)	High School Graduate	-0.0190 (0.0465)	0.0020 (0.0581)
Age	0.0001 (0.0012)	-0.0006 (0.0014)	Some College	0.0347 (0.0472)	-0.0365 (0.0586)
Hispanic/Latino	0.0188 (0.0371)	-0.0023 (0.0439)	Associate Degree	0.0292 (0.0530)	0.0215 (0.0647)
African American	-0.0391 (0.0408)	-0.0584 (0.0450)	Bachelor Degree	-0.0237 (0.0511)	-0.0232 (0.0644)
Unemployed	0.0463 (0.0429)	0.0450 (0.0542)	Numerical Series	-0.0003 (0.0006)	-0.0003 (0.0006)
Disabled	0.0638 (0.0533)	0.0673 (0.0547)	Picture Vocabulary	-0.0011** (0.0006)	-0.0003 (0.0006)
Retired	-0.1433*** (0.0442)	-0.1640*** (0.0469)	Verbal Analogies	-0.0008 (0.0006)	-0.009 (0.0007)

Notes: Authors' calculations using ALP data, survey 374. Sample restricted to families with less than 50K in annual income. Number of observations: 1871.

***
    p<0.01,

**
    p<0.05,

State of residence dummies also included in the model. Weighted estimates using sample weights.

*
p<0.1.