# ONLINE APPENDIX

# Targeting, Screening, and Retention: Evidence from California's Food Stamp Program

## A Unearned Income

I use SNAP Quality Control files (produced for USDA and made publicly available by Mathematica), as well as San Francisco case records, to study whether my inability to observe unearned income – like child support payments, Social Security benefits, and pension benefits – in my CDSS data risks my overstating the share of exiting households that are eligible for SNAP. The SNAP QC files come from surveys of randomly selected households enrolled in SNAP; these surveys are administered to ensure that states and counties are providing enrolled households with appropriate benefit amounts and not delivering assistance to ineligible households. The files contain highly detailed data on all household members' economic circumstances and demographic characteristics from FY 2013 to FY 2018. The San Francisco data includes case-level information on earned and unearned income, household composition, and benefits amounts every month between June 2016 and June 2019 (inclusive) for all cases active in those months. I use these data to document the total unearned income for each case.

Most enrolled households receive unearned income. In both datasets, approximately 60 percent of households report receiving some form of unearned income. The average amount received among all households is similar in both datasets: about $400 each month. If I condition on receiving any unearned income, the average increases to $600 for households in the SNAP QC data and $800 in the San Francisco data.

As expected, the likelihood of receiving unearned income, and the amount of unearned income that they receive, varies significantly by household type. For example, households with seniors (65+) are much more likely to report receiving unearned income and have higher average unearned income. Only 30 percent of households with earned income receive any unearned income. The average monthly unearned income among households with both earned and unearned income is about $500.

In Appendix Appendix Figure 1, I present the distribution of unearned income for four household types: those with and without seniors, and those with some or no earned income. A very few number of households report receiving unearned income above $2,500 in a given month. Both data sources exhibit similar patterns. In both, the share of households with monthly unearned income above $1,000 is very small. Only households with seniors tend to have unearned income above $1,000. And for households with earned income, the share receiving significant amounts of unearned income is very low. Households with earned income that approaches their eligibility thresholds are very unlikely to receive unearned income, and households receiving significant unearned income generally do not have earned income. Households with the highest unearned income still report receiving amounts that suggest they would be eligible for SNAP. Together, this evidence suggests that even if I could observe each household's unearned income, most households would remain income eligible.

I pursue one final exercise to make this point clear. I identify the average total unearned income for each

of 128 different household types in each year. I group households according to monthly earned income (four bins of $0, $0 to $1000, $1000 to $2000, and $2,000+), number of adults (0, 1, 2, 3+), number of children (0, 1, 2, 3+), and the presence of seniors. I group cases observed in the full SNAP data into the same household types. I apply the average unearned income data observed in the SNAP QC files to the corresponding household types in the SNAP data. I add each households' earned income to this simulated average unearned income, and re-calculate whether they appear income ineligible. This results in a negligible change in the average eligibility rate among leavers (See **??**).

Though I find that average reported unearned income among SNAP recipients is fairly low, suggesting it might not affect my measure of how many exiting households are still eligible for SNAP, I am unable to observe unearned income after a household leaves the program in either the SF case data or the SNAP QC files. Both only contain information for households while they're enrolled. I cannot rule out that households leave SNAP because of an increase in unearned income, which is recorded only after they leave.

I study this relevance of this using the Survey of Income and Program Participation (SIPP), a nationally representative panel survey of several thousand households interviewed every few months over a three to four year period. Respondents are asked to recall their individual- and household-level earned income and unearned income, as well as the income support programs in which they're enrolled, for the month they're surveyed as well as the three previous months. I use the 1996, 2001, 2004, and 2008 panels of the SIPP, spanning 1996 through 2013. I use these data to replicate **??**. Here, I study how reported earnings and unearned income changes each month relative to when households report first enrolling in SNAP.

I restrict to households ever enrolled in SNAP. I exclude households that are already enrolled in SNAP in the first month of their respective panel, since I cannot be sure how long they have been enrolled. I also exclude households that drop out of the survey but then return. Among the remaining households, I identify the first month that a household reports enrolling in SNAP, and I identify their total household earned and unearned income for 8 months before and 16 after that month. I then regress the amount of earned and unearned income on dummies for month relative to that initial enrollment month, controlling for household type, state and year fixed effects. I interact these month dummies with indicators for spell length. I plot the coefficients, which identify the relative change in earnings relative to the start of enrollment, for each month in the figures below.

Changes in reported earned income exhibit a similar pattern to those in the administrative data; enrollment starts when earnings fall, and earnings recovers at different rates depending on how long the household remains enrolled. However, I find no such pattern for unearned income. On average, neither initial enrollment nor program exit correspond with a change in unearned income. Reported unearned income remains fairly constant among these households before, during and after SNAP enrollment.

My inability to observe unearned income for households enrolled in SNAP does not risk my significantly overstating SNAP eligibility among those who exit. Average unearned income is low for households with earnings, meaning add households' true unearned income to their earnings is unlikely to push many into ineligibility. The average amount of unearned income received by households without earnings would still qualify most for the program, and households who leave SNAP do not exhibit significant changes in unearned income.

# B Food insecurity in the Current Population Survey

I impute predicted food insecurity using the Current Population Survey (CPS) December Food Security Supplement (FSS). This survey, administered every December alongside the monthly CPS, gathers information on a range of food security-related questions for more than 50,000 households each year. USDA uses their responses to identify whether the household is food insecure. I measure likelihood of food insecurity for different household types and demographic characteristics. I then create predicted measures of food insecurity for all possible combinations of variables observable in both the CPS and our CDSS data, and assign these rates to our SNAP households.

## B.1 Measuring food insecurity

I collect individual-level data from the December Basic Monthly CPS as well as the Food Security Supplement for the years 2005 to 2018 (the most recent year for which this data is available). The Basic Monthly CPS includes a range of detailed demographic data on all individuals residing in households included in the survey, including age, race, sex, education level, employment status and marital status for all individuals. In conjunction with the data provided from the responses to the Basic Monthly Survey questions, the December Supplement also asks a range of food security related questions. All households included in the Basic Monthly CPS for the month of December are eligible to be included for the Food Security Supplement. There is an initial screening for households with incomes in excess of 185 percent of the Federal Poverty Line. For households above this threshold, if they do not respond affirmatively to any questions that suggest possible food insecurity, they are removed from the Food Security Supplement sample. On average, approximately 80 percent of households are administered the full FSS panel of questions each December.

In order to construct a measure of food insecurity, the FSS asks households a range of questions regarding residents' access to food, including their ability to pay for food and whether individuals had to restrict meal sizes or substitute types of foods due to financial constraints. Using responses to these individual questions, a measure of food insecurity is then constructed ranging from "not food insecure" to "very food insecure." Appendix Appendix Table 2 presents the distribution of households included in our sample across this food security measure. Households that are food insecure are categorized as having either "low" or "very low" food security. Both low and very low food security households experienced periods of time during the past year where they were forced to reduce the quality or variety of their diets; very low food security households additionally experienced reduced quantities of food intake at some point during the year.

Using the measure reported above, I classify all households as either (1) not food insecure if they report being food secure or (2) food insecure if they report being either low food security or very low food security. In Appendix Appendix Table 3 below, I present summary statistics for this binary food insecurity measure by demographic and household composition characteristics.

## B.2 Likelihood of food insecurity

Using the individual level data described above, I restrict the sample to individuals with non-missing values for age, race, and sex. With this sample, I estimate logit regression specified below.

$$\Pr(Y_i = 1) = \beta_0 + \beta_1 \text{Race}_i + \beta_2(\text{Sex}_i \times \text{Age}_i \times \text{Adults}_i \times \text{Children}_i) + \theta_y + \varepsilon_i \quad (1)$$

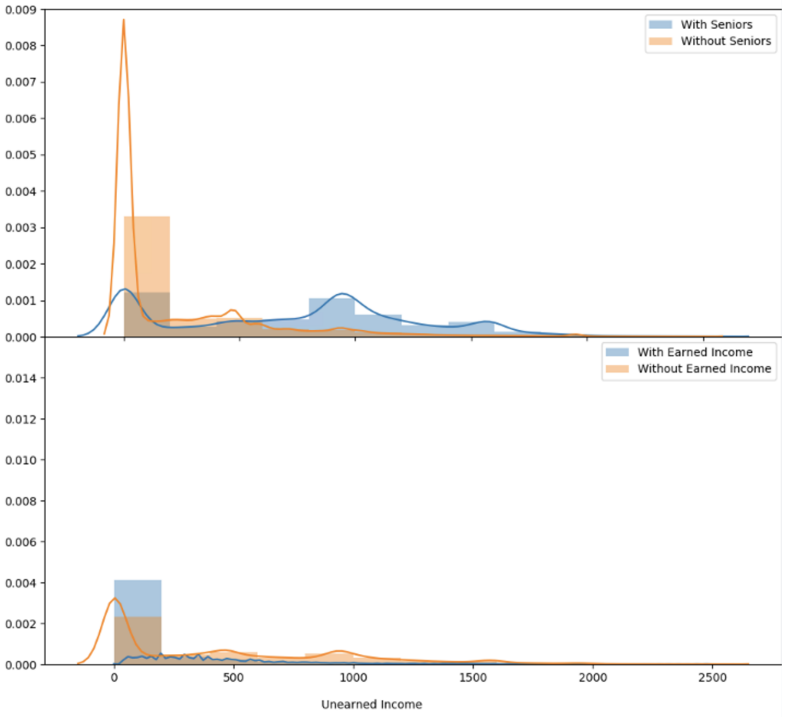
I discretize age into four bins: 0-17, 18-34, 35-60, and 60 and older. The number of adults is a dummy variable for whether there's one or more than one adult in the household. The number of children is a factor variable indicating whether there are 0, 1, or 2 or more children residing in a given household. *Race* is a factor variable with five levels corresponding to whether a given observation identifies as white, black, Hispanic, Asian or Pacific Islander, or Native American. $\theta$ captures average differences in food insecurity rates across years across all individuals. Since the CPS is designed to be representative at both the state and national level, I estimate variations of the model above for both the US as a whole and California specifically. Finally, I make use of the earnings data reported in the Outgoing Rotation Group (ORG) sub-sample to construct a measure of household monthly earned income and include a binned version of this measure in the specifications described above. In specifications making using of earnings data from the ORG sub-sample of households, income is banned in $500 increments, with levels included for both ORG households reporting zero dollars in earned income and households that were not included in the ORG.

Using the estimated coefficients from this model, I identify the predicted level of food insecurity for all combinations of these variables. Not all such combinations of demographic characteristics are present in the observed data, so prior to generating predicted values I expand our data set such that all possible demographic combinations are included and then I generate the predicted values.

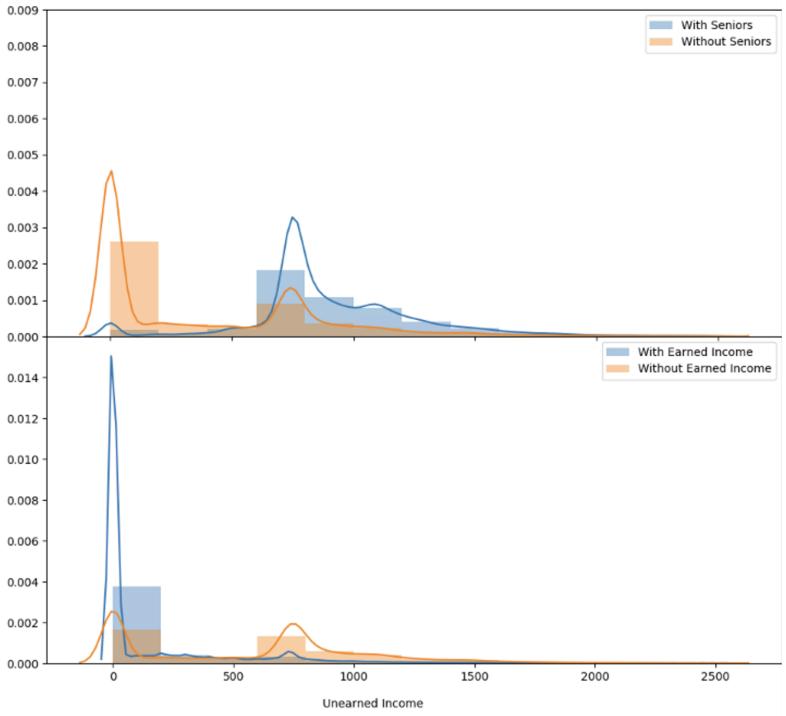
Appendix Appendix Table 3 reports summary statistics for each of these measures as well as a detailed description of the sample that is included in each specification. Appendix Appendix Figure 3 below displays the distribution of predicted food insecurity by race, and number of adults and number of children in the CPS household.

**Appendix Figure 1:** Distribution of unearned income among households enrolled in SNAP

**(a)** SF cases (2016-2019)



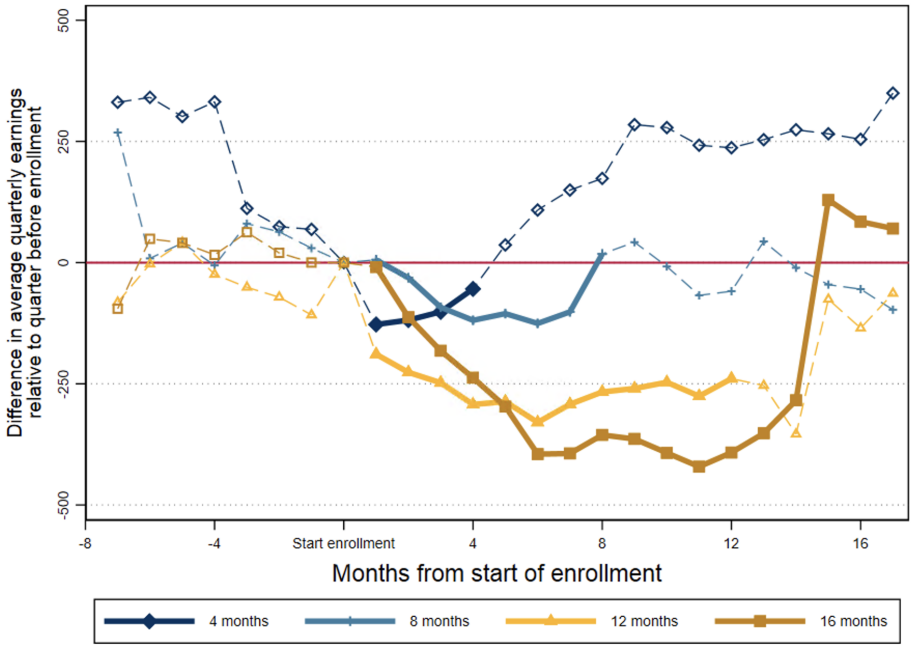

**(b)** SNAP QC cases (FY2013-FY2018)



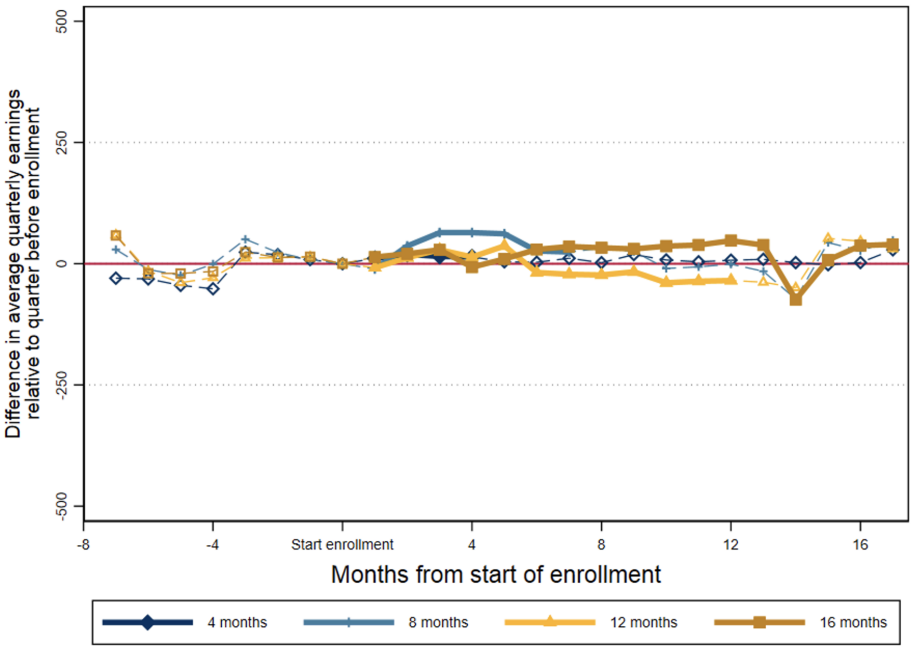

**Notes.** Appendix Appendix Figure 1 summarizes the distribution of unearned income among all SF SNAP cases and SNAP QC cases between 2016 and 2019 and FY 2013 and FY 2018, respectively, separated by households with and without seniors and households with and without earned income.

**Appendix Figure 2:** Income trends before and after SNAP enrollment, Survey of Income Program and Participation

**(a)** Earned income



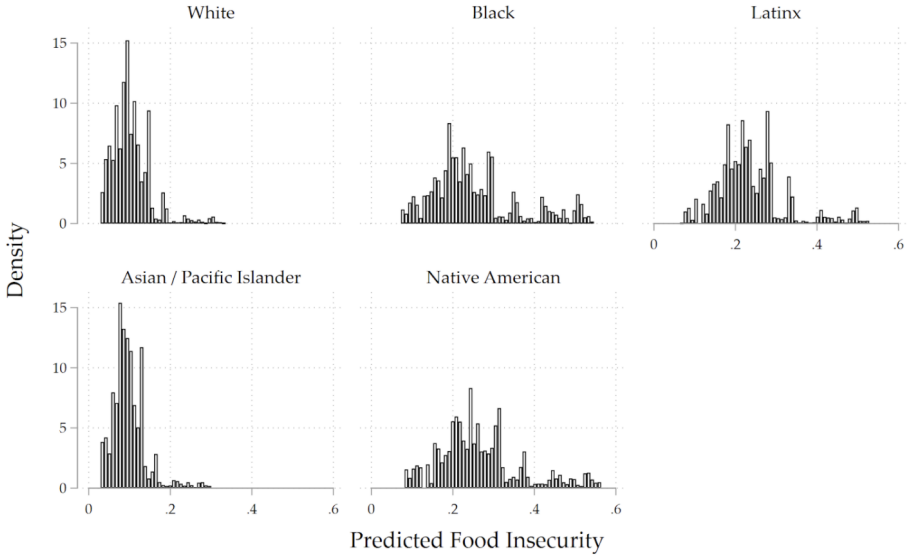

**(b)** Unearned income



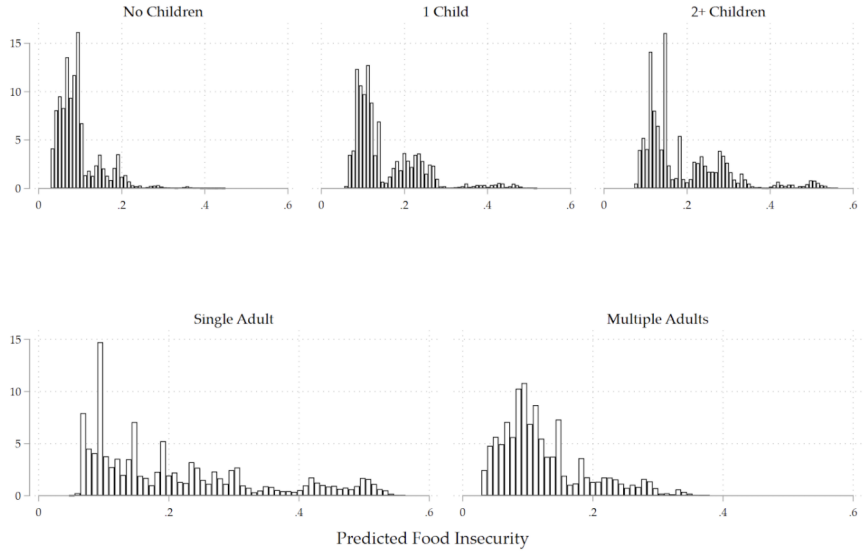

**Notes.** Appendix Appendix Figure 2 use the SIPP to estimate differences in income relative to the month before a SNAP enrollment begins, mirroring Figure 10 in the main paper. I identify each month relative to the first and last month of a continuous SNAP spell for SIPP households. I limit the analysis to households whose SNAP spells coincide with survey waves, and to the household's first SNAP enrollment. I regress total household earnings and total household unearned income on indicators for each month relative to the month preceding the start of the SNAP spell, an indicator for the length of the spell, and the interaction between the two. I also include household type, state, and year controls. Each figure plots the coefficient on the interaction term.

**Appendix Figure 3:** Distribution of predicted food insecurity measure by household type and race, Current Population Survey, 2005-2018

**(a)** Household type




**(b)** Race




**Notes.** Appendix Appendix Figure 3 summarizes distribution of predicted food insecurity by household type and race from CPS. Data is from the December CPS (2005-2018). Sample includes all individuals in the CPS with nonmissing demographic characteristics who are included in the universe for the FSS food security measure.

**Appendix Table 1:** Share of households that receive unearned income, and average unearned income amount, among SNAP cases in SF case records and SNAP QC records

| | SF cases | | SNAP QC | |
|---|---|---|---|---|
| | Share | Monthly average | Share | Monthly average |
| All households | .59 | $790 | .59 | $776 |
| Households with seniors | .80 | $971 | .91 | $930 |
| Households with children | .57 | $686 | .51 | $673 |
| Households with earned income | .28 | $543 | .32 | $533 |

**Notes.** Appendix Appendix Table 1 reports the fraction of households in each dataset who report receive unearned income, and the mean monthly amount of unearned income among those households. For the Mathematica data, households are defined as received unearned income if they report receipt during the one month they're surveyed. For the SF data, households are defined as received unearned income if they report receipt in any month during their enrollment spell. The monthly average amount represents the mean unearned income amount received by households during the months in which they report receiving any unearned income. For the SF case data, in which we observe households for multiple months, I identify each household's average amount over months in which they report receiving any unearned income, and then calculate the average over all these household means.

**Appendix Table 2:** Share of households that receive unearned income, and average unearned income amount, among SNAP cases in SF case records and SNAP QC records

| Household food insecurity scale | Number of individuals | Percent of sample |
|---|---|---|
| Food secure | 1,254,490 | 86 |
| Low food security | 131,327 | 9 |
| Very low food security | 68,324 | 5 |

**Notes.** Appendix Appendix Table 2 identifies share of CPS sample identified as food secure, food insecure, and very food insecure. The sample is all individuals included in the universe of respondents for the CPS-FSS survey as indicated by the variable *fsstatus* (IPUMS variable) and with non-missing food security status level for survey years 2005-2013.

**Appendix Table 3:** Average levels of food insecurity by individual and household demographics

| | Mean | SD |
|---|---|---|
| **Race** | | |
| White | 0.103 | 0.304 |
| Black | 0.253 | 0.435 |
| Latinx | 0.236 | 0.425 |
| Asian/Pacific Islander | 0.095 | 0.294 |
| Native American | 0.258 | 0.437 |
| **Number of Children** | | |
| 0 | 0.096 | 0.294 |
| 1 | 0.153 | 0.360 |
| 2+ | 0.190 | 0.392 |
| **Number of Adults** | | |
| Single Adult | 0.206 | 0.404 |
| Multiple Adults | 0.123 | 0.329 |
| **Age** | | |
| 0-17 | 0.191 | 0.393 |
| 18-34 | 0.157 | 0.364 |
| 35-59 | 0.126 | 0.332 |
| 60+ | 0.074 | 0.262 |

**Notes.** Appendix Appendix Table 3 identifies share of each person type that is identified as being food insecure. The sample is all individuals included in the universe of respondents for the CPS-FSS survey as indicated by the variable *fsstatus* (IPUMS variable) and with non-missing food security status level for survey years 2005-2013.

# C Additional Results

**Appendix Table 4:** Estimate log-odd effect of eligibility status on likelihood of SNAP exit

| | |
|---|---|
| Ineligible | 0.000 |
| | (.) |
| Eligible | -0.896*** |
| | (0.005) |
| × **Reporting month** | |
| Ineligible × Reporting month | 0.392*** |
| | (0.008) |
| Eligible × Reporting month | 0.000 |
| | (.) |
| N | 7,625,047 |
| Persons | 501,339 |
| $R^2$ | 0.15 |
| | |
| County | X |
| Year/Month | X |
| Demographics | X |

**Notes.** Appendix Table 4 reports estimated log-odd effects of likely eligibility status on likelihood of exit from a version of **??** in $z$ is an indicator for eligibility. I also control for county and date fixed effects, as well as demographic characteristics summarized in Appendix Table 14. Universe is a 5% sample of SNAP enrollment spells between 2014 and 2019, minus cases containing only seniors or children.

**Appendix Table 5:** Estimated marginal and average effect of eligibility status on likelihood of SNAP exit in reporting and non-reporting months

| | Marginal effect | | Average effect | |
|---|---|---|---|---|
| | Non-reporting month | Reporting month | Non-reporting month | Reporting month |
| Ineligible | . | . | 0.053 | 0.324 |
| | (.) | (.) | (0.000) | (0.001) |
| Eligible | -0.031 | -0.207 | 0.022 | 0.117 |
| | (0.000) | (0.001) | (0.000) | (0.000) |
| N | 7,625,047 | 7,625,047 | 7,625,047 | 7,625,047 |
| Persons | 501,339 | 501,339 | 501,339 | 501,339 |
| County | X | X | X | X |
| Year/Month | X | X | X | X |
| Demographics | X | X | X | X |

**Notes.** Appendix Table 5 reports estimated average and marginal effects of likely eligibility status on likelihood of exit. Average effects are estimated by transforming log effects estimated by **??**, in which $z$ is an indicator for eligibility. I also control for county and date fixed effects, as well as demographic characteristics summarized in Appendix Table 14. Universe is a 5% sample of SNAP enrollment spells between 2014 and 2019, minus cases containing only seniors or children.

**Appendix Table 6:** Estimated average likelihood of SNAP exit in reporting and non-reporting months by county

| | Non-reporting month | Reporting month |
|---|---|---|
| Alameda | 0.024 | 0.182 |
| | (0.000) | (0.002) |
| Alpine | 0.048 | 0.198 |
| | (0.014) | (0.053) |
| Amador | 0.032 | 0.167 |
| | (0.002) | (0.011) |
| Butte | 0.025 | 0.128 |
| | (0.000) | (0.003) |
| Calaveras | 0.025 | 0.143 |
| | (0.001) | (0.007) |
| Colusa | 0.029 | 0.175 |
| | (0.002) | (0.014) |
| Contra Costa | 0.023 | 0.180 |
| | (0.000) | (0.002) |
| Del Norte | 0.024 | 0.097 |
| | (0.001) | (0.005) |
| El Dorado | 0.026 | 0.183 |
| | (0.001) | (0.005) |
| Fresno | 0.023 | 0.149 |
| | (0.000) | (0.001) |
| Glenn | 0.032 | 0.145 |
| | (0.002) | (0.009) |
| Humboldt | 0.023 | 0.161 |
| | (0.001) | (0.004) |
| Imperial | 0.024 | 0.136 |
| | (0.000) | (0.003) |
| Inyo | 0.026 | 0.160 |
| | (0.002) | (0.012) |
| Kern | 0.025 | 0.157 |
| | (0.000) | (0.001) |
| Kings | 0.027 | 0.129 |
| | (0.001) | (0.003) |
| Lake | 0.030 | 0.150 |
| | (0.001) | (0.005) |
| Lassen | 0.026 | 0.148 |
| | (0.002) | (0.008) |
| Los Angeles | 0.025 | 0.114 |
| | (0.000) | (0.000) |
| Madera | 0.022 | 0.139 |
| | (0.001) | (0.003) |
| Marin | 0.020 | 0.170 |
| | (0.001) | (0.006) |
| Mariposa | 0.024 | 0.145 |
| | (0.002) | (0.012) |
| Mendocino | 0.022 | 0.169 |
| | (0.001) | (0.005) |
| Merced | 0.023 | 0.130 |
| | (0.000) | (0.002) |
| Modoc | 0.025 | 0.114 |
| | (0.002) | (0.012) |
| Mono | 0.027 | 0.267 |
| | (0.003) | (0.020) |
| Monterey | 0.038 | 0.200 |
| | (0.000) | (0.003) |
| Napa | 0.030 | 0.184 |
| | (0.001) | (0.007) |
| Nevada | 0.024 | 0.164 |
| | (0.001) | (0.006) |
| Orange | 0.025 | 0.180 |
| | (0.000) | (0.001) |
| Placer | 0.033 | 0.196 |
| | (0.001) | (0.005) |
| Plumas | 0.024 | 0.160 |
| | (0.002) | (0.011) |
| Riverside | 0.024 | 0.173 |
| | (0.000) | (0.001) |
| Sacramento | 0.024 | 0.146 |
| | (0.000) | (0.001) |
| San Benito | 0.023 | 0.158 |
| | (0.001) | (0.008) |
| San Bernardino | 0.025 | 0.154 |
| | (0.000) | (0.001) |
| San Diego | 0.023 | 0.177 |
| | (0.000) | (0.001) |
| San Francisco | 0.020 | 0.165 |
| | (0.000) | (0.002) |
| San Joaquin | 0.024 | 0.145 |

**Appendix Table 7:** Estimate log-odd effect of benefit amount levels on likelihood of SNAP exit

| | |
|---|---|
| $1-50 | 0.000 |
| | (.) |
| $50-100 | -0.298*** |
| | (0.016) |
| $100-150 | -0.477*** |
| | (0.015) |
| $150-200 | -0.500*** |
| | (0.011) |
| $200-250 | -0.583*** |
| | (0.016) |
| $250-300 | -0.624*** |
| | (0.015) |
| $300-350 | -0.592*** |
| | (0.015) |
| $350-400 | -0.511*** |
| | (0.012) |
| $400-450 | -0.731*** |
| | (0.016) |
| $450-500 | -0.662*** |
| | (0.015) |
| $500-550 | -0.482*** |
| | (0.013) |
| $550-600 | -0.802*** |
| | (0.018) |
| $600-650 | -0.618*** |
| | (0.014) |
| $650-700 | -0.712*** |
| | (0.021) |
| $700+ | -0.791*** |
| | (0.014) |
| × **Reporting month** | |
| $0-50 × Reporting month | 1.327*** |
| | (0.021) |
| $50-100 × Reporting month | 1.207*** |
| | (0.025) |
| $100-150 × Reporting month | 1.135*** |
| | (0.023) |
| $150-200 × Reporting month | 1.059*** |
| | (0.017) |
| $200-250 × Reporting month | 0.851*** |
| | (0.024) |
| $250-300 × Reporting month | 0.667*** |
| | (0.023) |
| $300-350 × Reporting month | 0.474*** |
| | (0.022) |
| $350-400 × Reporting month | 0.327*** |
| | (0.019) |
| $400-450 × Reporting month | 0.383*** |
| | (0.025) |
| $450-500 × Reporting month | 0.145*** |
| | (0.023) |
| $500-550 × Reporting month | 0.115*** |
| | (0.020) |
| $550-600 × Reporting month | 0.131*** |
| | (0.029) |
| $600-650 × Reporting month | 0.128*** |
| | (0.022) |
| $650-700 × Reporting month | -0.068 |
| | (0.036) |
| $700+ × Reporting month | 0.000 |
| | (.) |
| N | 7,091,315 |
| Persons | 492,359 |
| $R^2$ | 0.15 |
| | |
| County | X |
| Year/Month | X |
| Demographics | X |

**Notes.** Appendix Table 7 reports estimated log-odd effects of monthly benefit amount levels on likelihood of exit from a version of **??** in $z$ are levels of earnings. I also control for county and date fixed effects, as well as demographic characteristics summarized in Appendix Table 14. Universe is a 5% sample of SNAP enrollment spells between 2014 and 2019, minus cases containing only seniors or children.

**Appendix Table 8:** Estimated marginal and average effect of benefit amount levels on likelihood of SNAP exit in reporting and non-reporting months

| | Marginal effect | | Average effect | |
|---|---|---|---|---|
| | Non-reporting month | Reporting month | Non-reporting month | Reporting month |
| $1-50 | . | . | 0.041 | 0.375 |
| | (.) | (.) | (0.000) | (0.002) |
| $50-100 | -0.010 | -0.092 | 0.031 | 0.283 |
| | (0.001) | (0.003) | (0.000) | (0.003) |
| $100-150 | -0.015 | -0.140 | 0.026 | 0.235 |
| | (0.000) | (0.003) | (0.000) | (0.002) |
| $150-200 | -0.016 | -0.157 | 0.025 | 0.217 |
| | (0.000) | (0.002) | (0.000) | (0.001) |
| $200-250 | -0.018 | -0.203 | 0.023 | 0.172 |
| | (0.000) | (0.003) | (0.000) | (0.002) |
| $250-300 | -0.019 | -0.232 | 0.022 | 0.142 |
| | (0.000) | (0.003) | (0.000) | (0.001) |
| $300-350 | -0.018 | -0.251 | 0.023 | 0.124 |
| | (0.000) | (0.003) | (0.000) | (0.001) |
| $350-400 | -0.016 | -0.258 | 0.025 | 0.117 |
| | (0.000) | (0.002) | (0.000) | (0.001) |
| $400-450 | -0.021 | -0.274 | 0.020 | 0.101 |
| | (0.000) | (0.003) | (0.000) | (0.001) |
| $450-500 | -0.019 | -0.288 | 0.022 | 0.086 |
| | (0.000) | (0.003) | (0.000) | (0.001) |
| $500-550 | -0.015 | -0.275 | 0.026 | 0.099 |
| | (0.000) | (0.002) | (0.000) | (0.001) |
| $550-600 | -0.022 | -0.300 | 0.019 | 0.075 |
| | (0.000) | (0.003) | (0.000) | (0.001) |
| $600-650 | -0.019 | -0.286 | 0.023 | 0.089 |
| | (0.000) | (0.003) | (0.000) | (0.001) |
| $650-700 | -0.020 | -0.307 | 0.021 | 0.068 |
| | (0.001) | (0.003) | (0.000) | (0.002) |
| $700+ | -0.022 | -0.307 | 0.019 | 0.067 |
| | (0.000) | (0.002) | (0.000) | (0.001) |
| N | 7,091,315 | 7,091,315 | 7,091,315 | 7,091,315 |
| Persons | 492,359 | 492,359 | 492,359 | 492,359 |
| County | X | X | X | X |
| Year/Month | X | X | X | X |
| Demographics | X | X | X | X |

**Notes.** Appendix Table 7 reports estimated average effect of monthly benefit amount levels on likelihood of exit. Average effects are estimated by transforming log effects estimated by **??**, in which $z$ are benefit levels. I also control for county and date fixed effects, as well as demographic characteristics summarized in Appendix Table 14. Universe is a 5% sample of SNAP enrollment spells between 2014 and 2019, minus cases containing only seniors or children.

**Appendix Table 9:** Estimate log-odd effect of earnings levels on likelihood of SNAP exit

| | |
|---|---|
| exit | |
| 0 | 0.000 |
| | (.) |
| $1-499$ | 0.104*** |
| | (0.009) |
| $500-1000$ | 0.137*** |
| | (0.009) |
| $1000-1500$ | 0.257*** |
| | (0.009) |
| $1500-2000$ | 0.441*** |
| | (0.009) |
| $2000-2500$ | 0.628*** |
| | (0.009) |
| $2500-3000$ | 0.840*** |
| | (0.009) |
| $3000-3500$ | 1.030*** |
| | (0.011) |
| $3500-4000$ | 1.190*** |
| | (0.012) |
| $4000-4500$ | 1.373*** |
| | (0.014) |
| $4500-5000$ | 1.447*** |
| | (0.016) |
| $5000+$ | 1.642*** |
| | (0.011) |
| $\times$ **Reporting month** | |
| $0\times$ Reporting month | -0.161*** |
| | (0.016) |
| $1-499\times$ Reporting month | -0.273*** |
| | (0.019) |
| $500-1000\times$ Reporting month | -0.136*** |
| | (0.019) |
| $1000-1500\times$ Reporting month | -0.063*** |
| | (0.019) |
| $1500-2000\times$ Reporting month | -0.029 |
| | (0.019) |
| $2000-2500\times$ Reporting month | -0.008 |
| | (0.019) |
| $2500-3000\times$ Reporting month | -0.039* |
| | (0.019) |
| $3000-3500\times$ Reporting month | 0.005 |
| | (0.021) |
| $3500-4000\times$ Reporting month | 0.004 |
| | (0.023) |
| $4000-4500\times$ Reporting month | 0.015 |
| | (0.025) |
| $4500-5000\times$ Reporting month | 0.033 |
| | (0.029) |
| $5000+\times$ Reporting month | 0.000 |
| | (.) |
| N | 10004966 |
| Persons | 603,259 |
| $R^2$ | 0.15 |
| | |
| County | X |
| Year/Month | X |
| Demographics | X |

$^{*}\ p<0.05$, $^{**}\ p<0.01$, $^{***}\ p<0.001$

**Appendix Table 10:** Estimated marginal and average effect of earnings levels on likelihood of SNAP exit in reporting and non-reporting months

| | Marginal effect | | Average effect | |
|---|---|---|---|---|
| | Non-reporting month | Reporting month | Non-reporting month | Reporting month |
| 0 | 0.000 | 0.000 | 0.019 | 0.113 |
| | (.) | (.) | (0.000) | (0.000) |
| $1-499$ | 0.002 | -0.001 | 0.021 | 0.112 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $500-1000$ | 0.003 | 0.017 | 0.022 | 0.130 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $1000-1500$ | 0.006 | 0.041 | 0.025 | 0.154 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $1500-2000$ | 0.010 | 0.071 | 0.030 | 0.184 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $2000-2500$ | 0.016 | 0.105 | 0.036 | 0.217 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $2500-3000$ | 0.024 | 0.137 | 0.044 | 0.250 |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| $3000-3500$ | 0.033 | 0.183 | 0.053 | 0.296 |
| | (0.001) | (0.002) | (0.000) | (0.002) |
| $3500-4000$ | 0.042 | 0.218 | 0.061 | 0.330 |
| | (0.001) | (0.003) | (0.001) | (0.003) |
| $4000-4500$ | 0.053 | 0.262 | 0.072 | 0.375 |
| | (0.001) | (0.004) | (0.001) | (0.004) |
| $4500-5000$ | 0.058 | 0.284 | 0.078 | 0.397 |
| | (0.001) | (0.005) | (0.001) | (0.005) |
| $5000+$ | 0.073 | 0.323 | 0.093 | 0.436 |
| | (0.001) | (0.003) | (0.001) | (0.003) |
| N | 10004966 | 10004966 | 10004966 | 10004966 |
| Persons | 603,259 | 603,259 | 603,259 | 603,259 |
| County | X | X | X | X |
| Year/Month | X | X | X | X |
| Demographics | X | X | X | X |

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

**Appendix Table 11:** Estimate log-odd effect of pre-enrollment earnings on likelihood of SNAP exit

| | |
|---|---|
| exit | |
| 0 | 0.000 |
| | (.) |
| $1-499$ | -0.030** |
| | (0.010) |
| $500-1000$ | -0.007 |
| | (0.010) |
| $1000-1500$ | 0.023* |
| | (0.010) |
| $1500-2000$ | 0.029** |
| | (0.011) |
| $2000-2500$ | 0.072*** |
| | (0.012) |
| $2500-3000$ | 0.167*** |
| | (0.014) |
| $3000-3500$ | 0.262*** |
| | (0.018) |
| $3500-4000$ | 0.353*** |
| | (0.022) |
| $4000-4500$ | 0.406*** |
| | (0.026) |
| $4500-5000$ | 0.444*** |
| | (0.033) |
| $5000+$ | 0.546*** |
| | (0.019) |
| $\times$ **Reporting month** | |
| $0\times$ Reporting month | -0.126*** |
| | (0.028) |
| $1-499\times$ Reporting month | 0.083** |
| | (0.031) |
| $500-1000\times$ Reporting month | 0.133*** |
| | (0.031) |
| $1000-1500\times$ Reporting month | 0.166*** |
| | (0.031) |
| $1500-2000\times$ Reporting month | 0.204*** |
| | (0.031) |
| $2000-2500\times$ Reporting month | 0.236*** |
| | (0.032) |
| $2500-3000\times$ Reporting month | 0.174*** |
| | (0.034) |
| $3000-3500\times$ Reporting month | 0.150*** |
| | (0.037) |
| $3500-4000\times$ Reporting month | 0.095* |
| | (0.041) |
| $4000-4500\times$ Reporting month | 0.089 |
| | (0.047) |
| $4500-5000\times$ Reporting month | 0.078 |
| | (0.054) |
| $5000+\times$ Reporting month | 0.000 |
| | (.) |
| N | 10004966 |
| Persons | 603,259 |
| $R^2$ | 0.13 |
| | |
| County | X |
| Year/Month | X |
| Demographics | X |

$^{*}\ p<0.05$, $^{**}\ p<0.01$, $^{***}\ p<0.001$

**Appendix Table 12:** Estimated marginal and average effect of pre-enrollment earnings on likelihood of SNAP exit in reporting and non-reporting months

| | Marginal effect | | Average effect | |
|---|---|---|---|---|
| | Non-reporting month | Reporting month | Non-reporting month | Reporting month |
| 0 | 0.000 | 0.000 | 0.026 | 0.142 |
| | (.) | (.) | (0.000) | (0.000) |
| $1-499$ | -0.001 | 0.023 | 0.025 | 0.165 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $500-1000$ | -0.000 | 0.034 | 0.026 | 0.176 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| $1000-1500$ | 0.001 | 0.043 | 0.027 | 0.185 |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| $1500-2000$ | 0.001 | 0.050 | 0.027 | 0.192 |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| $2000-2500$ | 0.002 | 0.062 | 0.028 | 0.204 |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| $2500-3000$ | 0.005 | 0.067 | 0.030 | 0.209 |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| $3000-3500$ | 0.008 | 0.079 | 0.033 | 0.221 |
| | (0.001) | (0.003) | (0.001) | (0.003) |
| $3500-4000$ | 0.011 | 0.085 | 0.036 | 0.228 |
| | (0.001) | (0.004) | (0.001) | (0.004) |
| $4000-4500$ | 0.012 | 0.094 | 0.038 | 0.236 |
| | (0.001) | (0.005) | (0.001) | (0.005) |
| $4500-5000$ | 0.014 | 0.098 | 0.040 | 0.241 |
| | (0.001) | (0.006) | (0.001) | (0.006) |
| $5000+$ | 0.018 | 0.103 | 0.044 | 0.245 |
| | (0.001) | (0.004) | (0.001) | (0.004) |
| N | 10004966 | 10004966 | 10004966 | 10004966 |
| Persons | 603,259 | 603,259 | 603,259 | 603,259 |
| County | X | X | X | X |
| Year/Month | X | X | X | X |
| Demographics | X | X | X | X |

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

**Appendix Table 13:** Estimated log-odd effects of demographic characteristics on likelihood of exiting SNAP

| | Without earnings | With earnings |
|---|---|---|
| exit | | |
| **Race** | | |
| White | 0.000 | 0.000 |
| | (.) | (.) |
| Black | 0.037*** | -0.043*** |
| | (0.005) | (0.006) |
| Latinx | 0.035*** | 0.002 |
| | (0.007) | (0.007) |
| East Asian/PI | -0.122*** | -0.104*** |
| | (0.012) | (0.014) |
| SE Asian | -0.122*** | -0.150*** |
| | (0.011) | (0.014) |
| AIAN | -0.007 | 0.013 |
| | (0.025) | (0.027) |
| Other | 0.029*** | -0.016* |
| | (0.007) | (0.008) |
| **Household Type** | | |
| Children only | -0.187*** | |
| | (0.009) | |
| Adult(s) only | 0.000 | 0.000 |
| | (.) | (.) |
| Single parent | 0.041*** | -0.085*** |
| | (0.005) | (0.005) |
| 2+ adults with children | 0.306*** | -0.133*** |
| | (0.006) | (0.006) |
| Senior(s) only | -0.567*** | |
| | (0.009) | |
| Senior(s) with children | 0.025 | |
| | (0.029) | |
| **Language** | | |
| English | 0.000 | 0.000 |
| | (.) | (.) |
| Non-English | -0.080*** | 0.016* |
| | (0.005) | (0.006) |
| **CalWORKs Receipt** | | |
| Not received CalWORKs | 0.000 | 0.000 |
| | (.) | (.) |
| Received CalWORKs | 0.008* | 0.027*** |
| | (0.004) | (0.004) |
| **Race × Reporting month** | | |
| White | -0.172*** | 0.015 |
| | (0.046) | (0.011) |
| Black | -0.162*** | 0.037*** |
| | (0.046) | (0.010) |
| Latinx | -0.406*** | -0.223*** |
| | (0.047) | (0.012) |
| East Asian/PI | 0.042 | 0.167*** |
| | (0.049) | (0.019) |
| SE Asian | -0.067 | 0.099*** |
| | (0.048) | (0.020) |
| AIAN | -0.231*** | -0.037 |
| | (0.058) | (0.039) |
| Other | -0.214*** | 0.000 |
| | (0.047) | (.) |
| **Household Type × Reporting month** | | |
| Children only | 0.389*** | |
| | (0.045) | |
| Adult(s) only | 0.887*** | 0.636*** |
| | (0.044) | (0.008) |
| Single parent | 0.258*** | 0.013 |
| | (0.044) | (0.008) |
| 2+ adults with children | 0.227*** | 0.000 |
| | (0.044) | (.) |
| Senior(s) only | 1.486*** | |
| | (0.051) | |
| Senior(s) with children | 0.000 | |
| | (.) | |
| **Language × Reporting month** | | |
| English | -0.078*** | 0.002 |
| | (0.008) | (0.009) |
| Non-English | 0.000 | 0.000 |
| | (.) | (.) |
| **CalWORKs Receipt × Reporting month** | | |
| Not received CalWORKs | 0.126*** | 0.127*** |
| | (0.006) | (0.006) |
| Received CalWORKs | 0.000 | 0.000 |
| | (.) | (.) |
| N | 12743219 | 10004966 |
| Persons | 712,596 | 603,259 |
| $R^2$ | 0.13 | 0.15 |
| County | X | X |
| Year/Month | X | X |

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

**Appendix Table 14:** Estimated average and marginal effects of demographic characteristics on likelihood of exiting SNAP in reporting and non-reporting months

| | Marginal effect w/o earnings | | Average effect w/o earnings | | Marginal effect w/ earnings | | Average effect w/ earnings | |
|---|---|---|---|---|---|---|---|---|
| | Non-reporting month | Reporting month | Non-reporting month | Reporting month | Non-reporting month | Reporting month | Non-reporting month | Reporting month |
| **Race** | | | | | | | | |
| White | 0.000 | 0.000 | 0.024 | 0.147 | 0.000 | 0.000 | 0.026 | 0.153 |
| | (.) | (.) | (0.000) | (0.001) | (.) | (.) | (0.000) | (0.001) |
| Black | 0.001 | 0.006 | 0.025 | 0.153 | -0.001 | -0.003 | 0.024 | 0.150 |
| | (0.000) | (0.001) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) |
| Latinx | 0.001 | -0.023 | 0.025 | 0.124 | 0.000 | -0.028 | 0.026 | 0.125 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) |
| East Asian/PI | -0.003 | 0.012 | 0.021 | 0.159 | -0.002 | 0.006 | 0.023 | 0.159 |
| | (0.000) | (0.002) | (0.000) | (0.002) | (0.000) | (0.002) | (0.000) | (0.002) |
| SE Asian | -0.003 | -0.002 | 0.021 | 0.145 | -0.003 | -0.008 | 0.022 | 0.144 |
| | (0.000) | (0.002) | (0.000) | (0.001) | (0.000) | (0.002) | (0.000) | (0.002) |
| AIAN | -0.000 | -0.008 | 0.024 | 0.139 | 0.000 | -0.005 | 0.026 | 0.148 |
| | (0.001) | (0.003) | (0.001) | (0.003) | (0.001) | (0.004) | (0.001) | (0.003) |
| Other | 0.001 | -0.002 | 0.025 | 0.146 | -0.000 | -0.004 | 0.025 | 0.149 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) |
| **Household type** | | | | | | | | |
| Children only | -0.004 | -0.089 | 0.021 | 0.113 | | | | |
| | (0.000) | (0.001) | (0.000) | (0.001) | | | | |
| Adult(s) only | 0.000 | 0.000 | 0.025 | 0.201 | 0.000 | 0.000 | 0.027 | 0.221 |
| | (.) | (.) | (0.000) | (0.001) | (.) | (.) | (0.000) | (0.001) |
| Single parent | 0.001 | -0.078 | 0.026 | 0.123 | -0.002 | -0.098 | 0.024 | 0.123 |
| | (0.000) | (0.001) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) |
| 2+ adults with children | 0.009 | -0.051 | 0.033 | 0.150 | -0.003 | -0.105 | 0.023 | 0.116 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) |
| Senior(s) only | -0.011 | 0.005 | 0.014 | 0.207 | | | | |
| | (0.000) | (0.004) | (0.000) | (0.004) | | | | |
| Senior(s) with children | 0.001 | -0.105 | 0.025 | 0.096 | | | | |
| | (0.001) | (0.003) | (0.001) | (0.003) | | | | |
| **Language** | | | | | | | | |
| English | 0.000 | 0.000 | 0.025 | 0.147 | 0.000 | 0.000 | 0.025 | 0.147 |
| | (.) | (.) | (0.000) | (0.000) | (.) | (.) | (0.000) | (0.000) |
| Non-English | -0.002 | -0.000 | 0.023 | 0.147 | 0.000 | 0.002 | 0.025 | 0.148 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) | (0.000) | (0.001) |
| **CalWORKs receipt** | | | | | | | | |
| Not received CalWORKs | 0.000 | 0.000 | 0.024 | 0.154 | 0.000 | 0.000 | 0.025 | 0.153 |
| | (.) | (.) | (0.000) | (0.000) | (.) | (.) | (0.000) | (0.000) |
| Received CalWORKs | 0.000 | -0.015 | 0.024 | 0.139 | 0.001 | -0.012 | 0.025 | 0.140 |
| | (0.000) | (0.001) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) |
| N | 12743219 | 12743219 | 12743219 | 12743219 | 10004966 | 10004966 | 10004966 | 10004966 |
| Persons | 712,596 | 712,596 | 712,596 | 712,596 | 603,259 | 603,259 | 603,259 | 603,259 |
| County | X | X | X | X | X | X | X | X |
| Year/Month | X | X | X | X | X | X | X | X |

$^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$

**Appendix Table 15:** Estimate log-odd effect of predicted food insecurity level on likelihood of SNAP exit

| | |
|---|---|
| exit | |
| 0.0-.05 | 0.000 |
| | (.) |
| .05-.10 | -0.693*** |
| | (0.011) |
| .10-.15 | -0.878*** |
| | (0.012) |
| .15-.20 | -1.208*** |
| | (0.012) |
| .20-.25 | -1.444*** |
| | (0.013) |
| .25-.30 | -1.493*** |
| | (0.014) |
| .30-.35 | -1.715*** |
| | (0.014) |
| .35-.40 | -1.901*** |
| | (0.015) |
| × **Reporting month** | |
| 0.0-.05 × Reporting month | 0.707*** |
| | (0.017) |
| .05-.10 × Reporting month | 0.669*** |
| | (0.013) |
| .10-.15 × Reporting month | 0.534*** |
| | (0.014) |
| .15-.20 × Reporting month | 0.521*** |
| | (0.013) |
| .20-.25 × Reporting month | 0.344*** |
| | (0.013) |
| .25-.30 × Reporting month | 0.300*** |
| | (0.015) |
| .30-.35 × Reporting month | 0.259*** |
| | (0.015) |
| .35-.40 × Reporting month | 0.000 |
| | (.) |
| N | 8,733,753 |
| Persons | 521,792 |
| $R^2$ | 0.14 |
| County | X |
| Year/Month | X |
| Demographics | X |

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

**Appendix Table 16:** Estimated marginal and average effect of predicted food insecurity level on likelihood of SNAP exit in reporting and non-reporting months

| | Marginal effect | | Average effect | |
|---|---|---|---|---|
| | Non-reporting month | Reporting month | Non-reporting month | Reporting month |
| 0.0-.05 | 0.000 | 0.000 | 0.086 | 0.451 |
| | (.) | (.) | (0.001) | (0.003) |
| .05-.10 | -0.041 | -0.167 | 0.045 | 0.284 |
| | (0.001) | (0.003) | (0.000) | (0.001) |
| .10-.15 | -0.048 | -0.228 | 0.038 | 0.223 |
| | (0.001) | (0.003) | (0.000) | (0.001) |
| .15-.20 | -0.059 | -0.282 | 0.027 | 0.169 |
| | (0.001) | (0.003) | (0.000) | (0.001) |
| .20-.25 | -0.064 | -0.332 | 0.022 | 0.119 |
| | (0.001) | (0.003) | (0.000) | (0.001) |
| .25-.30 | -0.065 | -0.342 | 0.021 | 0.109 |
| | (0.001) | (0.003) | (0.000) | (0.001) |
| .30-.35 | -0.069 | -0.365 | 0.017 | 0.086 |
| | (0.001) | (0.003) | (0.000) | (0.001) |
| .35-.40 | -0.072 | -0.394 | 0.014 | 0.057 |
| | (0.001) | (0.003) | (0.000) | (0.000) |
| N | 8,733,753 | 8,733,753 | 8,733,753 | 8,733,753 |
| Persons | 521,792 | 521,792 | 521,792 | 521,792 |
| County | X | X | X | X |
| Year/Month | X | X | X | X |
| Demographics | X | X | X | X |

$^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$