SNAP RECIPIENTS' LABOR SUPPLY IN THE PRESENCE OF CHILDREN IN HOUSEHOLDS

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Abstract: Using combined data from the American Time Use Survey and the Current Population Survey Food Security Supplement with a Random Effects Tobit model, this study finds that SNAP participation has had a negligible negative impact on time spent per day on working. Further, the presence of children has had an insignificant effect on labor supply decisions for all respondent adults, regardless of SNAP participation status. Estimates also confirm that young adults, females, and Hispanics with children who live in SNAP participating households are likely to reduce the usual minutes worked per day. On the contrary, full-time employment and higher education increase labor supply among all respondent adults, especially those with children, regardless of SNAP participation status. Targeting respectable groups of individuals using appropriate approaches and strategies is vital for not only promoting labor supply, employment and higher earnings but also reducing food insecurity among SNAP recipients.

Keywords: Time Allocation, Labor Supply, SNAP, Welfare Policy, Poverty

JEL Classification: J22, I32, I38

I. INTRODUCTION

The time allocation decisions in the labor market are determined by market wages, *non*-labor income, and one's tastes or preferences for work and leisure. The Supplemental Nutrition Assistance Program (SNAP), formerly known as the "food stamps program (FSP),"[1] provides cash assistance to low-income households to reduce food insecurity, and it increases program recipient's' *non*-labor income. Since SNAP benefits decline with family income, researchers have long

investigated if SNAP reduces recipients' work incentives and labor supply. Most existing studies find a negative relation between SNAP participation and labor force participation, as predicted by the theory.

SNAP, the nation's largest nutrition program, served over 40 million people yearly during 2010-2021 (except for the years 2019 and 2020). In 2013, the program reached its highest number at 47.6 million (Pew Research Center, 2023). For recipients' benefits, participants' maximum average monthly benefit allotment continued to increase until 2013 (except for the 2014-2019 period) and reached the highest level in its history in 2021 (USDA, 2020, 2021).[2] Similar trends are apparent for the total benefits, in which the highest total was $108.6 billion in 2021, with the next-highest being $76 billion in 2013.

SNAP participation is voluntary, and eligible households with greater food insecurity apply for the program. Yet, SNAP participants are traditionally likely to be households in which the reference person is less educated, Black, non-US citizen, and female headed (Shaefer & Gutierrez, 2013). In fiscal year 2019, 86 percent of all SNAP benefits were allocated to 81 percent of total households that have a child or children (hereafter, children), elderly persons, or persons with disabilities (USDA, 2021, 2022c). In sum, 91.8 percent of all SNAP benefits were presented to households with incomes at or below the federal poverty line (USDA, 2022c).[3]

Vickery (1977) argues that welfare recipients are "*time poor*" because households differ not only in their money income but also in their time resources. To investigate this argument further, this paper considers both time and income as poverty dimensions and examines labor supply decisions among SNAP recipients. Furthermore, the presence of children in a household could influence labor supply decisions. Households with children count approximately 40 percent of the SNAP program participation in recent years (USDA, 2022b),[4] and the larger number of children in a household lead to a higher likelihood of participating in SNAP (Shaefer and Gutierrez, 2013). To the best of the authors' knowledge, there is limited research on how SNAP affects the labor supply of households with children. Thus, this paper further investigates how the presence of children in a household affects SNAP recipients' labor supply.

To do so, we consider the following four groups: SNAP recipients with children, SNAP recipients without children, *non*-SNAP recipients with children, and *non*-SNAP recipients without children. Proposed questions are empirically tested with a Random Effects Tobit model using combined data from the American Time Use Survey (ATUS) and the Current Population Survey Food Security Supplement (CPS-FSS) for 2013-2018. The empirical findings using the combined CPS-ATUS-FSS data in this study contribute to the literature by, first, measuring the importance of time, in addition to income, as a poverty dimension and, second, offering additional insights into understanding both SNAP and non-SNAP

participants' labor supply decisions in the presence of children in a household. Based on the empirical results, this study further offers ways to improve the labor market outcomes of SNAP recipients.

This study finds that SNAP participation has had a negligible negative impact on time spent per day for working among SNAP recipients. Further, the presence of children in a household has had an insignificant effect on labor supply decisions for all respondent adults, regardless of SNAP participation status. Empirical findings also show that young adults (age 18-35), females, and Hispanics, especially those with children who live in SNAP-participating households, are likely to reduce the *usual* minutes worked per day. On the other hand, full-time employment, being male and higher education increase time spent working per day among all respondent adults, especially among those with children, regardless of SNAP participation status.

The empirical findings in this study suggest that targeting and assisting young adults (age 18-35), females and Hispanics, particularly those with children living in SNAP participating households, are important for increase labor supply. Additionally, obtaining full-time employment and higher educational attainment (at least Bachelor's degree) among all recipient adults, especially among those with children, regardless of SNAP participation status are vital. These findings offer useful implications for workers, firms, and policymakers in improving labor market outcomes among SNAP recipient adults in recent years in the United States.

The remainder of this paper proceeds as follows. Section II presents the existing literature on SNAP, recipients with children and their labor supply; Section III discusses data, descriptive statistics, and empirical strategy. Section IV offers empirical results for the effect of SNAP on labor supply, presents major findings of this study and discussions, along with SNAP recipients during the Covid-19 pandemic. Lastly, we summarize and conclude in Section V.

II. EXISTING LITERATURE ON SNAP, RECIPIENTS WITH CHILDREN AND LABOR SUPPLY

The primary goal of SNAP is to provide cash assistance to low-income households to reduce food insecurity. The program also aims to assist job training for recipients, help them earn income and become self-sufficient by requiring work requirements and offering various support programs, and eventually reduce the number of individuals or families that depend on the program.

SNAP benefits have the structure of a traditional income support program in which guaranteed income benefits decline with family income at the legislated benefit reduction rate. One of the ongoing debates over social welfare programs, including SNAP concerns work incentives among program recipients.

A substantial literature has drawn attention to the role of SNAP on work incentives using various data and methods and finds that SNAP reduces work incentives and labor supply among program recipients, as predicted by the theory. For example, the earlier study by Fraker and Moffitt (1988) estimates hours-of-work functions for female household heads using a bivariate selection model and finds that the FSP reduces weekly work hours by 1 hour or a 10 percent reduction from 10 to 9. Huffman and Jensen (2008) investigate the effect of SNAP, labor force participation, and food insecurity status on low-income households using a four-equation structural model with the 1998 Survey of Program Dynamics data and find a negative relation between FSP participation and labor force participation. Hoynes and Schanzenbach (2012) estimate the impacts of SNAP on labor force participation and annual hours worked with the 1968-1978 PSID data using quasi-experimental methods and a difference-in-difference approach and find that SNAP participation reduces employment and decreases 183 annual hours among single-parent households with a female head sample. However, they did not find any significant impacts from the overall sample. Wagle (2013) also finds work-disincentive effects of FSP by testing the poverty-reducing effects of FSP on labor supply and income with a combination of family-level microdata and state-level macro indicators for the 2004-2007 period using a fixed effects model and the IV regressions. East (2018) also finds that single female recipients reduce the employment rate by approximately 6 percent, and married men reduce their working hours by approximately 5 percent.

Some studies reversed the findings, as various welfare reforms were implemented and recipients' labor supply behavior responded accordingly. Moffitt (2002) finds that the FSP has little effect on work disincentives after reviewing the vast literature on the impact of welfare programs on labor supply. In more recent research, Fayaz Farkhad and Meyerhoefer (2018) find that SNAP not only increases the likelihood of employment among low-income households, but also the probability of working full time. Further, Bitler et al. (2021) use the data for every SNAP recipient for Colorado (2012-2013) and Oregon (2008-2009) and computed bunching estimators in order to examine SNAP recipients' bunching behavior where benefits are initially taxed. They find "no overall evidence of large labor supply responses" (p. 494) due to changes in the benefit reduction rate.

Another strand of literature investigates the effect of SNAP work requirements on recipients' labor supply. In theory, implementing work requirements for the program is likely to lead welfare recipients at the margin to seek paying-work activities. Harris (2021) finds that work requirements increased the employment of able-bodied adults without dependents (ABAWDs), although it decreased their participation in SNAP and caused "nontrivial exits from the SNAP program" (p. 92) from people who could not meet the work requirements. He also documents

that the increasing administrative costs needed to document the eligibility associated with work requirements can decrease SNAP participation without increasing employment. Further, Cuffey et al. (2022) focus on low-income high school dropout older prime-age ABAWDs from 2005 to 2009 and find a positive effect of SNAP work requirements on employment. They also report that aging out of the SNAP work requirements decreases their work efforts – including employment and hours worked. Similarly, Han (2022) finds that SNAP work exemptions do not decrease employment among older prime-age ABAWDs, although they reduce their work hours.

Additional studies of SNAP on labor supply extend analyses of households with the presence of children. Shaefer and Gutierrez (2013) find that each additional child in a household is associated with a higher likelihood of participating in SNAP. Fayaz Farkhad and Meyerhoefer (2018) document that a subsidy program that helps working families to cover parts of childcare expenses[5] may increase SNAP recipients' labor supply and the likelihood of working full time, in conjunction with work requirements imposed in SNAP. Their subgroup analyses also indicate that the effects of SNAP on employment are concentrated among women, which is consistent with the importance of SNAP and employment in conjunction with childcare affordability.

III. DATA, DESCRIPTIVE STATISTICS AND EMPIRICAL STRATEGY

3.1. Data

This study uses combined data from the ATUS[6] and the CPS-FSS[7] for 2013-2018. The first data file is the ATUS data for 2013-2018, which measures how Americans allocate their time to life's activities. The ATUS respondents are randomly selected from individuals who have completed their eighth and final month of interviews for the Current Population Survey (CPS) and are interviewed only once about how they spent their time. Appendix 1.1 discusses the descriptions of ATUS data in detail.

The second data file is the December CPS-FSS data for 2013-2018. The Food Security Supplement (FSS) is a supplement to that month's CPS. The FSS questions were asked of all interviewed households in December of each year, starting in 1995. The CPS-FSS data are household-level data and consist of answers by household respondents to questions about household food expenditures, use of food assistance programs, and experiences and behaviors related to food security.[8] Using the CPS-FSS data, we gather information about whether a respondent household receives a SNAP benefit during a month of the survey year.

The CPS data follows a 4-8-4 sampling design, which implies that households are in the survey sample for four consecutive months, out of the survey sample

for eight months, and return to the survey for another four months. It is important to note that only a subsample of ATUS respondents can potentially link to any given CPS month. Further, only those in a subsample of these ATUS respondents participate in the December CPS-FSS survey. Therefore, respondent households who participated in the ATUS survey can potentially match with respondents who were also interviewed in the CPS-FSS survey in appropriate months and in appropriate year.

After completing several steps to generate the CPS-ATUS-FSS appended data sample for this study, the CPS-ATUS-FSS appended data for the 2013-2018 periods initially contains 132,872 observations. We only consider those eligible to work, regardless of their labor force status in this study. After restrictions, the sample size for the 2013-2018 CPS-ATUS-FSS appended data is reduced to 38,751 households and 79,739 individual adults who are aged 18-66 with appropriate sample selection criteria. Appendix 1.2 describes the CPS-ATUS-FSS appended data in detail.

The variables of interest in this study include the status of SNAP participation, the presence of children under the age of 18 in a household, employment status, hours worked per day, real hourly wage, and selected socioeconomic characteristics. Table 1 lists the selected socioeconomic characteristics of the sample.

3.2. Descriptive Statistics

Figure 1 presents the trends of SNAP participation and the presence of children under 18 in percentages at the *household* level and the *individual* level, separately, by each year. The percentages of those who are receiving SNAP benefits are similar at both the *household* level (Figure 1.1) and the *individual* level (Figure 1.2) for the 2013-2018 periods, and the results are consistent with the existing literature, confirming that the highest record of average SNAP participation in the history is marked in 2013 (Chang et al., 2021). The figure further draws attention to some interesting points. At the *household* level, Figure 1.1 shows that households with children are *more* likely to rely on SNAP participation than households without children, which is in line with the existing findings (Shaefer and Gutierrez (2013)). On the other hand, an opposite trend is apparent at the *individual* level. Figure 1.2 shows that adults with children are significantly *less* likely to rely on SNAP participation than adults without children, which is an unexpected and surprising result.

Table 1 lists selected socioeconomic characteristics of all respondent adults, SNAP recipients, and *non*-SNAP recipients separately. Although 56% of all respondent adults in the data sample are living with children under the age of 18, SNAP recipient adults were more likely than *non*-SNAP recipient adults to live

with their children (59.4% vs. 52.4% in Columns (2) and (3)). Interestingly, both SNAP recipient adults and *non*-SNAP recipient adults reported approximately 8 hours as their *usual* hours worked per day, but the *actual* hours worked per day were slightly longer among SNAP recipient adults than *non*-SNAP recipient adults (7.29 hours vs. 7.19 hours in Columns (2) and (3)). In addition, SNAP recipient adults were more likely to hold either a full-time or part-time job compared to *non*-SNAP recipient adults (74.8% vs. 73.4% in Columns (2) and (3)). It is likely that the general work requirement set by the SNAP Program encouraged the recipients to stay in the labor market (USDA, 2022b).[9] The mean of the real hourly wage for both SNAP recipient adults and *non*-SNAP recipient adults is similar ($20.88 vs. $21.38), but there are large variations in their real hourly wages. Table 1 further shows that SNAP recipient adults were more likely to be married and Hispanic but less likely to be educated than *non*-SNAP recipient adults.

Table 2 shows selected socioeconomic characteristics of SNAP recipient and *non*-SNAP recipient adults by the presence of children under 18 in their household. Column (1) of the table focuses on adults living with children under the age of 18, while Column (2) shows adults without children under 18. Approximately 76.5% of adults with children under 18, regardless of their SNAP status, hold either full-time or part-time job, while only 73% of SNAP recipient adults without children and 70.2% of *non*-SNAP recipient adults without children are in the labor market. Among those in the labor force, *non*-SNAP recipient adults with children reported the shortest *actual* hours worked per day (7.14 hours), followed by SNAP recipient adults with children (7.21 hours), indicating that the presence of children in a household reduces the *actual* working hours per day. On the contrary, the mean of the real hourly wage was the lowest among SNAP recipient adults without children ($19.87), followed by *non*-SNAP recipient adults without children ($20.65), although their earnings have large variations.[10] It is worth noting that adults without children, regardless of their SNAP status, are likely to be older and unmarried. Further, SNAP recipient adults without children are least educated, followed by SNAP recipient adults with children (21.9% and 22.6%, respectively, hold at least Bachelor's degree) and are likely Hispanic, relative to *non*-SNAP recipient adults regardless of the child's presence in a household.

3.3. Empirical Strategy

The dependent variable in this study is a respondent adult's hours worked per day. We consider the *actual* hours spent working per day, which is a time-use variable. However, a substantial portion of respondents did not allocate time to work (and thus did not report time spent on working) on the date of the ATUS diary interview. To address the limited sample size on the *actual* hours spent working per day, we also consider the *usual* hours worked per day, which is a

non-time use variable, to obtain reliable results. Given the nature of the data, our selected sample is censored and consists of zero-value observations, which are generated by respondents who did not spend time on working, and non-zero value observations, which are from those who spent time on this activity.

To account for the qualitative differences between zero observations and continuous observations, we estimate the following specification using a maximum likelihood estimation (MLE) of the censored and truncated regression model, known as the Tobit model (Tobin, 1958).

$$T_{it}^* = \delta SNAP_{it} + \gamma child_{it} + X_{it}\beta + \varepsilon_{it}, \tag{1}$$

where T_{it}^* denotes the respondent's time spent per day on working, either the *actual* minutes spent working per day or the *usual* minutes worked per day. $SNAP_{it}$ represents a dummy variable that takes a value of one in year t if respondent i receives SNAP benefits. *child* represents a dummy variable that takes a value of one in year t if respondent i has a child under the age of 18, and $å_{it}$ is a mean zero individual error term. Further, X_i in (1) is a vector of exogenous variables of respondents' individual characteristics, which include real hourly wage, employment status, marital status, age, gender, education, race, ethnicity (Hispanic status), metropolitan status, and region. We also control for the unemployment rate as a macro indicator.

The nonlinear models are likely to face challenges and shortcomings because of assumptions that are placed in them, especially when attempting to control for unobserved heterogeneity (Ai et al., 2015; Green, 2004; Honoré, 1992; and Powell, 1986). However, it is still important to control for heterogeneity when a panel or pooled data is utilized (Honoré, 1992). We thus estimate equation (1) using the MLE of the Tobit model with random effects to control unobserved heterogeneity and gain the reliability of estimates.

The post-estimation analysis is recommended in the Tobit model. Thus, we also present the marginal effects[11] of all explanatory variables in the estimated specifications using the decomposition procedure developed by McDonald and Moffitt (1980).

IV.   EMPIRICAL RESULTS AND DISCUSSIONS

This section examines the estimation results of SNAP recipients' time allocation to the labor market. Columns (1)-(3) in Table 3 show the summary of the marginal effects of the Random Effects Tobit estimates for all respondent adults, for SNAP recipient adults and *non*-SNAP recipient adults. Additionally, Columns (4)-(7) presents the summary of the marginal effects of the Random Effects Tobit estimates for respondent adults by SNAP status with particular attention to the presence of

children in a household.[12] We focus on the analyses of how SNAP, child presence, and real hourly wage impact time spent per day on working. We also evaluate the effect of selected socioeconomic factors on their time spent on working. Further, we discuss the implications derived from the empirical findings and the status of SNAP Recipients during the Covid-19 Pandemic.

4.1. Empirical Results

Column (1) in Table 3 shows that the marginal effect of *SNAP* is insignificant when the dependent variable is the *actual* minutes spent working per day (Y1). It also shows that the marginal effect of *SNAP* is negative and statistically significant at the 10% level when the dependent variable is the *usual* minutes worked per day (Y2). These results are weakly supported empirically and indicate that SNAP participation has a negligible negative impact on time spent per day on working. This finding supports the existing studies that confirm no overall evidence of labor supply responses due to SNAP participation (Bitler et al., 2021; and Moffitt, 2002). Columns (1)-(3) in Table 3 shows that the marginal effects of *child* are all statistically insignificant, implying that the presence of children has no effect on time spent per day on working for all respondent adults. This finding suggests that labor supply decisions are independent of the presence of children in a household, regardless of SNAP participation.

Columns (1)-(3) in Table 3 further show that the marginal effects of *real hourly wage* are all negative and statistically significant. This result confirms that a higher real hourly wage reduces time spent per day on working; however, its magnitude is very small (less than a minute) for all groups. It is important to note, however, that SNAP recipients are slightly more likely to reduce time spent per day on working than *non*-SNAP recipients (0.6 or 0.3 minutes (in Column (2)) vs. 0.5 or 0.2 minutes (in Column (3)) when the real hourly wage increases. In addition, the marginal effects of *Age 18-35* and *Hispanic* on the *usual* minutes worked per day (Y2) are all negative and statistically significant. These results suggest that young adults (age 18-35) and being Hispanic reduce time spent per day on working. Especially, the time reduction is more pronounced among young adults (age 18-35) with children (by 11-12 minutes per day, as in Columns (4) and (5)) and Hispanic SNAP participants (by 10-11 minutes per day, as in Columns (4) and (6)).

On the other hand, Columns (1)-(7) in Table 3 confirm that the marginal effects of *full-time* and *male* are both positive and statistically significant. It is evident that full-time employment status and being male increase time spent per day on working. The time increase, however, is the *least* among adults in *non*-SNAP recipients' household with children, followed by adults in SNAP recipients' household with children, suggesting that the presence of children under in a

household slightly impact negatively on time spent working per day among full-time workers. The time increase is the largest among male adults with children.

Turning to education, the marginal effects of Bachelor's Degree and *Advanced Degree* on the *usual* minutes worked per day (Y2) in Columns (1)-(7) in Table 3 are all positive and statistically significant. These results suggest that, at least, having a Bachelor's degree increases time spent per day on working and that the higher the educational level, the longer the minutes worked per day. The time increase, however, is the *least* among adults in *non*-SNAP recipients' household with children, followed by adults in SNAP recipients' household with children, suggesting that the presence of children slightly impact negatively on time spent working per day among those with at least a Bachelor's degree.

4.2. Discussion and Implications from Empirical Findings

In light of the empirical results indicating that SNAP participation has had a negligible negative impact on time spent per day on working and that the presence of children under 18 in a household has had an insignificant effect on labor supply decisions, there are important points to consider.

First, SNAP recipients' labor supply decisions were found to be independent of SNAP participation. It is likely that SNAP recipients' labor market attachment is enhanced due to the ongoing welfare reforms, such as changes in the benefit reduction rate (Bitler et al., 2021) and work requirements on employment (Cuffey et al. 2022; and Harris, 2021).

Second, the effect of the presence of children under 18 in a household on labor supply decisions is trivial for all respondent adults, regardless of SNAP participation status. This striking result reflects the potential labor supply smoothing in which respondent adults tend to adjust time allocation decisions in the labor market in response to the presence of children in a household. In other words, respondent adults base their labor supply decision on the expectation of having children in a household, and an individual's labor supply is relatively stable from year-to-year. This labor supply smoothing could also be promoted by various initiatives and programs. For example, a work-related child-care subsidy program helps eligible working families to cover parts of childcare expenses and allows them to work (Fayaz Farkhad and Meyerhoefer, 2018).

Third, the inverse relationship between the real hourly wage and time spent per day on working for all respondent adults is confirmed, although the magnitude is very small (less than a minute per day). Because SNAP recipients are slightly more likely than *non*-SNAP recipients to reduce time spent per day on working as the real hourly wage increases, this result mirrors the concerns and debate over the traditional notion in which SNAP reduces the incentive to work when guaranteed income benefits decline with family income. Additional investigation

of SNAP recipients' labor supply and earnings is warranted when there is a net income limit for SNAP and if SNAP recipients restrict their earnings by reducing hours worked.

Lastly, the most vulnerable group of individuals who rely on SNAP are young adults (age 18-35), females and Hispanics, especially those with children who are living in SNAP participating households. Assisting these groups by having full-time employment and acquiring higher educational attainment increases time spent working per day and encourages labor supply among SNAP recipients as well as non-SNAP recipients.

4.3. SNAP Recipients during the Covid-19 Pandemic

During the Covid-19 pandemic, the demand for welfare programs, including SNAP, suddenly and sharply increased.[13] It is because welfare recipients are likely to be placed in low-paying industries as front-line workers, and thus, they are more likely to be the first group of people who are laid off, furloughed, or out of work compared to their counterparts. Welfare recipients are disproportionately affected by the pandemic and its economic conditions and face income loss.

SNAP was adjusted to raise the participants' maximum monthly benefit to assist welfare recipients during the pandemic. It reached the highest level in the program's history at the beginning of October 1, 2021 (USDA, 2022a). The maximum monthly allotments for a household of four members reached $835 for FY 2022 (effective October 1, 2021, through September 30, 2022), an increase of 6.8 percent from $782 for FY 2021. In addition, from January 2021 to June 30, the Consolidated Appropriations Act also raised maximum allotments to 115 percent of the June 2020 value of the Thrifty Food Plan.

The empirical findings of this study show that assisting young adults (age 18-35), females and Hispanics, especially those with children who are living in SNAP participating households, are important. The findings also suggest that promoting full-time employment and higher education among SNAP recipients are the most effective ways to promote their labor supply. Targeting respectable groups of individuals using appropriate approaches and strategies is vital for not only promoting labor supply, employment and higher earnings but also reducing food insecurity among SNAP recipients.

V.   CONCLUSION

This study examines time allocation decisions in the labor market among SNAP program recipients in relation to the presence of children in their households, considering both time and income as the poverty dimension. It also compares labor supply behavior between SNAP recipients and non-SNAP recipients by separating them into four groups: SNAP recipients with children; SNAP recipients

without children; non-SNAP recipients with children; and non-SNAP recipients without children. We empirically test proposed questions with a Random Effects Tobit model using combined data from the American Time Use Survey (ATUS) and the Current Population Survey Food Security Supplement (CPS-FSS) for 2013-2018.

We find that SNAP participation has had a negligible negative impact on time spent per day on working among SNAP recipients. This finding is inconsistent with the traditional theoretical prediction in which SNAP recipients reduce their labor supply. We also find no overall evidence of labor supply responses due to the presence of children in a household for all respondent adults. This result reflects the potential labor supply smoothing in which SNAP recipients adjust labor supply in response to the presence of children in a household. The empirical results further confirm that young adults, females and Hispanics with children who live in SNAP participating households are likely to reduce the usual minutes worked per day. On the other hand, full-time employment and higher education encourage labor supply among all respondent adults, especially those with children, regardless of SNAP participation status.

In addition to reducing food insecurity among low-income households, SNAP aims to reduce the number of individuals or families that depend on the program and help them to be more self-sufficient by requiring work requirements. This study suggests that targeting and assisting young adults (age 18-35), females and Hispanics, particularly those with children living in SNAP participating households, are important for improving labor supply behavior. Additionally, obtaining full-time employment and higher educational attainment (at least Bachelor's degree) among all recipient adults, especially among those with children, regardless of SNAP participation status are vital.

Analyses of time-use time-diary data among program recipients contribute to the existing literature by measuring the importance of time, in addition to income, as a poverty dimension. This study also expands on existing studies regarding how the presence of children in households plays a role in labor supply decisions among SNAP recipients and non-SNAP recipients. We further discuss the current challenges and the ways to improve the labor market outcomes of SNAP recipients amid the Covid-19 pandemic and the accompanying economic crisis. The findings of this research provide useful implications for workers, firms, and policymakers in improving labor market outcomes among the SNAP recipient adults in recent years in the United States.

NOTES

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1. "The 2008 Farm Bill" officially changed the name of the Food Stamps Program (FSP) to SNAP in October 2008.

2. The total *cost* of SNAP was $79.9 billion in fiscal year (FY) 2013 and reached $113.8 billion in FY 2021. For detail: https://fns-prod.azureedge.us/sites/default/files/resource-files/SNAPsummary-6.pdf.

3. SNAP effectively targets benefits to the neediest households. For further detail: https://fns-prod.azureedge.us/sites/default/files/resource-files/Characteristics2019.pdf (Table 3.1).

4. For detail: https://www.fns.usda.gov/SNAP-household-trends

5. Employment-related childcare programs are available for eligible working families in many states, including the Employment Related Day Care program (in Oregon), the Working Connections Child Care (in Washington), the Work Related Childcare for Tennessee Child Support (in Tennessee), and the Child Care Works Program (in Pennsylvania), and more.

6. The ATUS data for 2013-2018 is sponsored by the Bureau of Labor Statistics (BLS), conducted by the U.S. Census Bureau, and is available at https://www.bls.gov/tus/data.htm.

7. The CPS-FSS is collected by the U.S. Census Bureau for the Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA), and it was available via the DataFerrett system until June 2020 and is now available on the *Microdata Access* system maintained by the U.S. Census Bureau.

8. Food Security Supplement questionnaire include various SNAP related questions. A detailed description is available in the CPS Food Security Supplement Data File: Technical Documentation 2013-2018, prepared by the ERS of the USDA (2019).

9. The participants without disabilities are required to register for work or be registered by the State agency, must participate in a State employment and training or workfare program if assigned by the State agency, and must agree to accept any suitable job offered to them. The participants, who are working a minimum of 30 hours a week or earning an amount equal to the Federal minimum wage multiplied by 30 hours, are exempt from the requirements. For further detail: https://fns-prod.azureedge.us/sites/default/files/resource-files/Characteristics2019.pdf.

10. In the 2013-2018 data, the maximum real hourly wage of *non*-SNAP recipient adults without children was $1,338.01, while that of SNAP recipient adults without children was $575. The maximum real hourly wage of *non*-SNAP recipient adults without children was only $282, which was the lowest among all four groups.

11. The marginal effect is the conditional mean of the dependent variable (time spent per day on working) when the explanatory variable (i.e., the real hourly wage) changes by one unit.

12. The detailed empirical results of the Random Effects Tobit model are available upon request from authors.

13. The World Health Organization (WHO) declared a Covid-19 pandemic on March 11, 2020, and the United States announced a national emergency on March 13, 2020. The WHO and the United States government have not yet officially announced the end of the Covid-19 pandemic.

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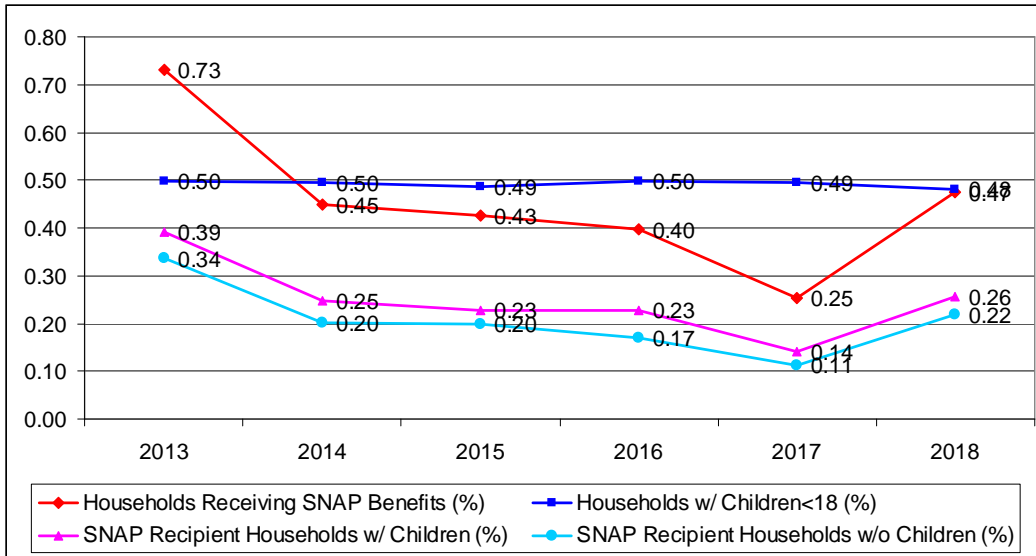
Figure 1: SNAP and Presence of Children - Recipient Household Level, 2013-2018

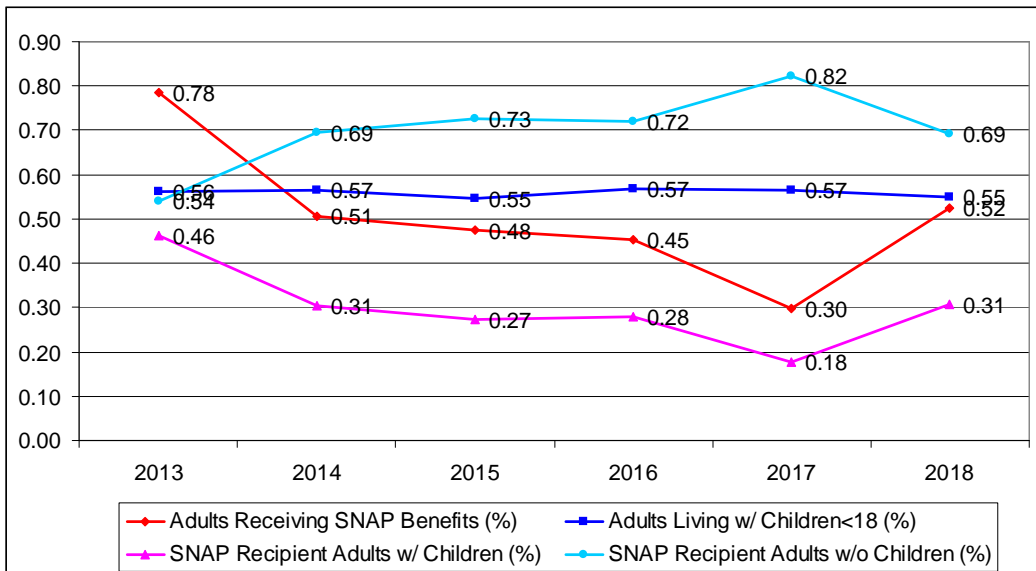*Source:* CPS-ATUS-FSS appended data for the 2013-2018

Figure 2: SNAP and Presence of Children - Recipient Adult Level, 2013-2018

Source: CPS-ATUS-FSS appended data for the 2013-2018

Table 1: Selected Socioeconomic Characteristics, by SNAP Status 2013-2018

Data: 2013-2018; Aged 18-66
Total # of Household = 38,751
Total # of Household Receiving SNAP= 17,706 (22%)

Socio-Economic Variables	(1) All Respondent Adults n=79,739			(2) SNAP Recipient Adults n= 40,516 (51%)			(3) non-SNAP Recipient Adults n=39,223 (49%)		
	Total	Mean	S.D	Total	Mean	S.D	Total	Mean	S.D
Presence of Children Under Age 18 (yes=1)	44627	0.560	0.496	24071	0.594	0.491	20556	0.524	0.499
Actual Hours Spent Working per Day - Time Use	6881	7.234	3.385	3184	7.289	3.423	3697	7.187	3.352
Usual Hours Worked per Day	52259	7.943	2.141	26715	7.929	2.139	25544	7.957	2.143
Real Hourly Wage (Index 2012=100)	49824	21.122	15.795	25525	20.876	14.712	24299	21.381	16.855
Employment Status Full-Time	49551	0.621	0.485	25334	0.625	0.484	24217	0.617	0.486
Part-Time	9596	0.120	0.325	4995	0.123	0.329	4601	0.117	0.322
Not in the Labor Force	20585	0.258	0.438	10185	0.251	0.434	10400	0.265	0.441
Marital Status Married	44252	0.555	0.497	23788	0.587	0.492	20464	0.522	0.500
Unmarried	35480	0.445	0.497	16726	0.413	0.492	18754	0.478	0.500
Age 18-35	27628	0.346	0.476	14637	0.361	0.480	12991	0.331	0.471
36-50	27955	0.351	0.477	14788	0.365	0.481	13167	0.336	0.472
51-66	24156	0.303	0.460	11091	0.274	0.446	13065	0.333	0.471
Gender Male	38027	0.477	0.499	19943	0.492	0.500	18084	0.461	0.498
Female	41712	0.523	0.499	20573	0.508	0.500	19943	0.539	0.498
Education > HS Grad-Diploma	7495	0.094	0.292	3934	0.097	0.296	3561	0.091	0.287
HS Grad-Diploma or Equiv	18614	0.233	0.423	9267	0.229	0.420	9347	0.238	0.426
Some College/Associate Degree	19247	0.241	0.428	9636	0.238	0.426	9611	0.245	0.430
Bachelor's Degree	12291	0.154	0.361	5922	0.146	0.353	6369	0.162	0.369
Advanced Degree	6517	0.082	0.274	3113	0.077	0.266	3404	0.087	0.282
Race White only	48108	0.603	0.489	24224	0.598	0.490	23884	0.609	0.488
Black only	10905	0.137	0.344	4995	0.123	0.329	5910	0.151	0.358
Other	5151	0.065	0.246	2653	0.065	0.247	2498	0.064	0.244
Ethnicity Hispanic	13488	0.169	0.375	7089	0.175	0.380	6399	0.163	0.370
Non-Hispanic	50676	0.636	0.481	24783	0.612	0.487	25893	0.660	0.474

Employment Status: 7 out of 79739 adults (or 2 out of 40516 SNAP recipient adults & 5 out of 39223 non-SNAP recipient adults) had invalid responses.
Marital Status: 7 out of 79739 adults (or 2 out of 40516 SNAP recipient adults & 5 out of 39223 non-SNAP recipient adults) had invalid responses.
Education: 15575 out of 79739 adults (or 8644 out of 40156 SNAP recipient adults & 6931 out of 39223 non-SNAP recipient adults) had invalid responses.
Race: 15575 out of 79739 adults (or 8644 out of 40156 SNAP recipient adults & 6931 out of 39223 non-SNAP recipient adults) had invalid responses.
Ethnicity: 15575 out of 79739 adults (or 8644 out of 40156 SNAP recipient adults & 6931 out of 39223 non-SNAP recipient adults) had invalid responses.

Table 2: Selected Socioeconomic Characteristics, by SNAP and Children 2013-2018

Data: 2013-2018; Aged 18-66
Total # of Household = 38,751
Total # of Household Receiving SNAP= 17,706 (22%)

Socio-Economic Variables	With Children Aged <18						Without Child/Children Aged <18					
	(1) Adults in SNAP Recipients' Household n=24071 (out of 79739) or 30%			(2) Adults in Non-SNAP Recipients' Household n=20556 (out of 79739) or 26%			(3) Adults in SNAP Recipients' Household n=16445 (out of 79739) or 21%			(4) Adults in Non-SNAP Recipients' Household n=18667 (out of 79739) or 23%		
	Total	Mean	S.D	Total	Mean	S.D	Total	Mean	S.D	Total	Mean	S.D
Actual Hours Spent Working per Day (Time Use)	1785	7.207	3.503	1734	7.144	3.308	1399	7.393	3.315	1963	7.225	3.391
Usual Hours Worked per Day	16242	7.935	2.155	14036	7.953	2.137	10473	7.920	2.116	11508	7.961	2.151
Real Hourly Wage (Index 2012=100)	15449	21.533	14.791	13277	21.984	14.906	10076	19.869	14.535	11022	20.653	18.913
Employment Full-Time	15295	0.635	0.481	13149	0.640	0.480	10039	0.610	0.488	11068	0.593	0.491
Status Part-time	3026	0.126	0.332	2566	0.125	0.331	1969	0.120	0.325	2035	0.109	0.312
Unemployed/Not in LF	5748	0.239	0.426	4837	0.235	0.424	4437	0.270	0.444	5563	0.298	0.457
Marital Married	16376	0.680	0.466	13185	0.641	0.480	7412	0.451	0.498	7279	0.390	0.488
Status Unmarried	7693	0.320	0.466	7367	0.358	0.480	9033	0.549	0.498	11387	0.610	0.488
Age 18-35	8941	0.371	0.483	7714	0.375	0.484	5696	0.346	0.476	5277	0.283	0.450
36-50	11212	0.466	0.499	9545	0.464	0.499	3576	0.217	0.413	3622	0.194	0.395
51-67	3918	0.163	0.369	3297	0.160	0.367	7173	0.436	0.496	9768	0.523	0.499
Gender Male	11299	0.469	0.499	8964	0.436	0.496	8644	0.526	0.499	9120	0.489	0.500
Female	12772	0.531	0.499	11592	0.564	0.496	7801	0.474	0.499	9547	0.511	0.500
Education > HS Grad-Diploma	2402	0.100	0.300	1900	0.092	0.290	1532	0.093	0.291	1661	0.089	0.285
HS Grad-Diploma or Equiv	5280	0.219	0.414	4640	0.226	0.418	3987	0.242	0.429	4707	0.252	0.434
Some College/Associate Degree	5520	0.229	0.420	4862	0.237	0.425	4116	0.250	0.433	4749	0.254	0.436
Bachelor's Degree	3490	0.145	0.352	3209	0.156	0.363	2432	0.148	0.355	3160	0.169	0.375
Advanced Degree	1943	0.081	0.272	1842	0.090	0.286	1170	0.071	0.257	1562	0.084	0.277

		(1)			(2)			(3)			(4)		
Race	White only	14771	0.614	0.487	12649	0.615	0.487	9453	0.575	0.494	11235	0.602	0.490
	Black only	2119	0.088	0.283	2233	0.109	0.311	2876	0.175	0.380	3677	0.197	0.398
	Other	1745	0.072	0.259	1571	0.076	0.266	908	0.055	0.228	927	0.050	0.217
Ethnicity	Hispanic	4207	0.175	0.380	3405	0.166	0.372	2882	0.175	0.380	2994	0.160	0.367
	Non-Hispanic	14428	0.599	0.490	13048	0.635	0.482	10355	0.630	0.483	12845	0.688	0.463

Employment Status: 2 out of 40516 SNAP recipients and 5 out of 39223 *non*-SNAP respondents had invalid responses.
Marital Status: 2 out of 40516 SNAP recipients and 5 out of 39223 *non*-SNAP respondents had invalid responses.
Education: 8644 out of 40516 SNAP recipients and 6931 out of 39223 *non*-SNAP respondents had invalid responses.
Race: 8644 out of 40516 SNAP recipients and 6931 out of 39223 *non*-SNAP respondents had invalid responses.
Ethnicity: 8644 out of 40516 SNAP recipients and 6931 out of 39223 *non*-SNAP respondents had invalid responses.

Table 3: Random Effects Tobit Model - Summary of Marginal Effects of Time Spent on Working
1. All Respondent Adults and Respondent Adults by SNAP Status: 2013-2018

Data: 2013-2018; Aged 18-66
Y1: Actual Minutes Spent Working per Day
Y1: (Time Use Variable)
Y2: Usual Minutes Spent Working per Day
Y2: (Non-Time Use Variable)

	Appendix 2.1 (1) All Respondents		Appendix 2.2 (2) Adults in SNAP Recipients' Household		Appendix 2.3 (3) Adults in Non-SNAP Participating Household	
	Y1	Y2	Y1	Y2	Y1	Y2
SNAP Participation (Yes=1)	6.136 (4.936)	-1.425* (0.791)	-	-	-	-
Child Presence (Yes=1)	1.150 (5.724)	-0.883 (0.879)	-1.004 (8.426)	-1.271 (1.217)	3.219 (7.794)	-0.571 (1.272)
Hourly Wage	-0.536*** (0.183)	-0.269*** (0.027)	-0.603** (0.282)	-0.299*** (0.042)	-0.477** (0.241)	-0.247*** (0.036)
Employment Status: Full-Time	93.747*** (7.009)	232.468*** (1.121)	98.136*** (10.109)	231.670*** (1.560)	91.067*** (9.703)	233.214*** (1.615)
Age: 18-35	-4.200 (6.642)	-8.277*** (1.094)	-10.158 (9.984)	-8.838*** (1.556)	-0.814 (8.900)	-7.615*** (1.545)
Age: 36-50	-0.184 (6.346)	1.156 (1.046)	-0.611 (9.471)	1.294 (1.461)	-0.464 (8.550)	0.943 (1.501)
Gender: Male	23.837*** (5.530)	24.780*** (0.802)	26.573*** (7.306)	25.713*** (1.116)	20.606*** (6.787)	23.976*** (1.156)
Marital Status: Married (Yes=1)	-10.845** (5.534)	5.824*** (0.890)	-21.329** (8.430)	7.580*** (1.267)	-1.695 (7.373)	4.139*** (1.259)
Education: High School with Diploma	10.889 (12.204)	0.506 (1.491)	18.859 (18.155)	-0.517 (2.056)	6.013 (16.473)	1.628 (2.166)
Education: Some College/Associate Degree	7.346 (12.023)	3.367** (1.492)	12.183 (17.873)	3.102 (2.054)	5.649 (16.260)	3.677* (2.174)

	Y1	Y2	Y1	Y2	Y1	Y2
Education: Bachelor's Degree	7.346*	10.878***	-30.913*	11.640***	-14.142	10.321***
	(12.351)	(1.621)	(18.281)	(2.261)	(16.760)	(2.332)
Education: Advanced Degree	-46.850***	26.736***	-39.535**	24.543***	-51.913***	28.910***
	(12.701)	(1.849)	(18.914)	(2.604)	(17.155)	(2.636)
Race: White	-5.665	4.411***	-23.0712*	6.739***	14.109	1.946
	(9.217)	(1.347)	(12.851)	(1.874)	(13.236)	(1.940)
Race: Black	7.349	-4.116**	-11.679	-3.156	28.902*	-5.472**
	(11.410)	(1.702)	(16.170)	(2.406)	(16.216)	(2.412)
Ethnicity: Hispanic	1.630	-9.059***	-0.434	-10.136***	4.831	-7.933***
	(7.398)	(1.168)	(10.857)	(1.622)	(10.124)	(1.684)

Notes: ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. Empirical Results are available in Appendix 2.

Table 3: Random Effects Tobit Model - Summary of Marginal Effects of Time Spent on Working
2. Respondent Adults by SNAP Status: 2013-2018

Data: 2013-2018; Aged 18-66 Y1 : Actual Minutes Spent Working per Day Y1 : (Time Use Variable) Y2: Usual Minutes Spent Working per Day Y2: (Non-Time Use Variable)	Appendix 2.4 (4) Adults in SNAP Recipients' Household With Children Aged <18		Appendix 2.5 (5) Adults in Non-SNAP Recipients' Household With Children Aged <18		Appendix 2.6 (6) Adults in SNAP Recipients' Household W/O Children Aged <18		Appendix 2.7 (7) Adults in Non-SNAP Recipients' Household W/O Children Aged <18	
	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2
Hourly Wage	-0.700*	-0.224***	-0.546***	-0.151**	-0.445	-0.427***	-0.349	-0.310***
	(0.361)	(0.054)	(0.330)	(0.058)	(0.453)	(0.068)	(0.354)	(0.047)
Employment Status: Full-Time	89.481***	230.008***	81.941***	227.902***	106.098***	233.243***	94.230***	238.161***
	(14.284)	(2.000)	(14.104)	(2.159)	(14.450)	(2.502)	(13.578)	(2.437)
Age: 18-35	-18.839	-10.900***	-15.405	-11.655***	-5.405	-7.315***	-0.364	-4.869**
	(15.602)	(2.222)	(15.249)	(2.384)	(13.674)	(2.269)	(11.539)	(2.118)
Age: 36-50	-4.555	0.470	-25.363*	-1.145	-0.889	0.650	19.193*	0.779
	(14.294)	(2.021)	(14.156)	(2.216)	(13.703)	(2.280)	(11.587)	(2.218)
Gender: Male	28.144***	29.116***	24.642**	28.078***	25.128**	20.178***	15.536*	18.725***
	(10.094)	(1.445)	(10.279)	(1.580)	(10.807)	(1.778)	(9.213)	(1.726)
Marital Status: Married (Yes=1)	-14.741	8.682***	7.076	5.665***	-23.884**	6.027***	-5.374	2.687
	(12.625)	(1.694)	(11.455)	(1.738)	(11.464)	(1.949)	(9.902)	(1.874)
Education: High School with Diploma	23.174	1.303	-2.382	2.228	14.808	-2.814	11.286	2.507
	(24.126)	(2.582)	(23.990)	(2.818)	(27.824)	(3.405)	(22.768)	(3.382)
Education: Some College/Associate Degree	4.911	4.785*	14.180	1.234	19.763	0.558	-2.990	7.424**
	(23.441)	(2.577)	(23.757)	(2.839)	(27.780)	(3.404)	(22.448)	(3.373)
Education: Bachelor's Degree	-35.814	10.723***	-29.404	5.579*	-28.774	12.023***	-3.598	15.075***
	(23.963)	(2.857)	(24.476)	(3.100)	(28.445)	(3.726)	(23.289)	(3.570)
Education: Advanced Degree	-51.195**	21.521***	-41.653*	20.445***	-27.610	28.735***	-67.367***	38.289***
	(24.562)	(3.260)	(25.129)	(3.464)	(29.842)	(4.338)	(23.677)	(4.090)
Race: White	-18.742	6.974***	11.574	2.615	-34.647	6.978**	14.577	1.523
	(15.944)	(2.304)	(17.151)	(2.467)	(22.011)	(3.222)	(20.837)	(3.124)
Race: Black	-3.808	-2.429	39.447*	-2.885	0.131	-3.188	24.227	-6.902*
	(22.693)	(3.230)	(23.712)	(3.337)	(0.203)	(3.768)	(23.748)	(3.613)
Ethnicity: Hispanic	-15.385	-9.570***	9.651	-8.595***	-22.297	-10.866***	-0.429	-7.097***
	(14.460)	(2.087)	(15.445)	(2.291)	(24.842)	(2.577)	(13.532)	(2.488)

Notes: ***, **, * indicate significance at the 1%, 5% and 10% level, respectively. Empirical Results are available in Appendix 2.

Appendix 1
Detailed Description of Data

1. **The American Time Use Survey (ATUS) Data**

   The ATUS multi-year microdata have six data sources: (1) the respondent file; (2) the roster file; (3) the activity file; (4) the activity summary file; (5) the who file; and (6) the ATUS-CPS file. The respondent file in the ATUS data contains one record per individual with information about the respondents. The information includes individual demographic characteristics such as age, sex, race, ethnicity (Hispanic status), educational attainment, marital status, metropolitan living status, wage, weeks worked, occupation, industry, and employment status. The roster file contains information about the age, sex, and relationship to the ATUS respondent of every household member. The activity file includes activity-level information collected in the ATUS. The activity summary file provides information collected in the ATUS diary, with over 400 categories of time use. It also contains ATUS respondents' detailed accounts of the total number of minutes spent on each activity during the diary date for a 24-hour window, starting at 4 AM on the day before the interview and ending at 4 AM on the day of the interview.[1] The who file contains codes that indicate who was present during each activity. Lastly, the ATUS-CPS file gathers one record per household member for all households in which an individual participates in the ATUS and contains each household member's demographic status. These data sources are combined and defined as the combined-ATUS data.

2. **The CPS-ATUS-FSS Appended Data: 2013-2018**

   We follow the following three steps to generate the CPS-ATUS-FSS appended data sample for this study.

   First, we define all possible MIS-8 months in ATUS data that could have received the CPS-FSS data. And we consider only members of households that were interviewed for the December CPS-FSS and who were also selected to be contacted for an ATUS interview in appropriate months (September-December) and appropriate year (2012-2018). This process generates a data sample that contains respondents in the ATUS survey who completed the December Food Security Supplement (FSS) questionnaires that is a supplement to that month's CPS. We define this data sample as the ATUS-CPS data.

   Second, we link the ATUS-CPS data (two datasets sampled from the same subset of the CPS in the ATUS) and the CPS-FSS data, using the unique household, individual respondent (or person) identifiers, age, and sex. We repeat this process for each year, defining this data sample as the ATUS-CPS-FSS data. At this stage, we only consider those with a valid response on case (both household and individual respondent) identifier and SNAP participation in each year's data sample. We also gather information on whether a respondent household has children under 18. Due to non-

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[1] Time use categories include working and work-related activities (05). A detailed description is available in the American Time Use Survey Multi-Year Activity Coding Lexicons 2003-2018 (BLS, 2019).

response, invalid-response, and/or changing household composition in data samples, we could match approximately 20% of respondents in the ATUS sample with the CPS-FSS sample in each year's data.

Third, we appended the CPS-ATUS-FSS data as we have data from 2013 to 2018 and generated the CPS-ATUS-FSS appended data for the 2013-2018 periods. The 2013-2018 CPS-ATUS-FSS appended data initially contains 132,872 observations. We consider adults who are eligible to work (older than 18 and less than 67) in this study. With sample criteria, the sample size for 2013-2018 is reduced to 38,751 households and 79,739 individuals aged 18-66.