



# Short-term labor supply response to the timing of transfer payments: Evidence from the SNAP program

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## ABSTRACT

We study the effect of the timing of SNAP payments on weekly labor supply using data from the CPS. We rely on exogenous variation in the fielding of CPS interviews relative to benefit receipt to estimate labor supply of SNAP eligible individuals at the end of their SNAP benefit cycle (i.e. about to receive benefits) compared to individuals at the start of their cycle (i.e. just received benefits). We find that the timing of SNAP benefits impacts labor supply at the intensive margin, while the extensive margin is unaffected. Conditional on being employed, eligible individuals at the end of their SNAP cycle are more likely to be absent from work compared to individuals at the start of their SNAP cycle. They are also less likely to temporarily shift to full time work. Results are more pronounced for individuals with higher predicted benefit amounts. Our findings suggest that a worsening of individuals' status (e.g. health problems, child care issues) at the end of their SNAP cycle adversely impacts short-term work presence.

## 1. Introduction

Transfer payment programs are an important policy tool to support low-income households. The Supplemental Nutrition Assistance Program (SNAP) is the largest federal nutrition assistance program in the United States. In a typical month, SNAP provides assistance to over 40 million low-income individuals by distributing funds that can be used to purchase food. A large literature studies the average effects of SNAP's eligibility and work requirements on labor supply (See [Fraker and Moffitt \(1988\)](#), [Hoyne and Schanzenbach \(2012\)](#), [Bitler et al. \(2021\)](#), [East \(2018\)](#) and [Cook and East \(2023\)](#)). This literature suggests that the SNAP program leads to small reductions in labor supply in the short run but may increase labor supply over the long run. Nevertheless, a question that appears to have been overlooked in the literature is whether the timing of SNAP influences beneficiaries' labor market outcomes in the period around transfer receipt.

This paper aims to close this gap by studying whether SNAP eligible individuals alter their labor supply throughout the benefit cycle. Using data from the Current Population Survey (CPS), we leverage exogenous variation in the temporal distance between the SNAP disbursement date

in a given state and the start of the CPS reference week, that is the week for which labor market activity questions are answered by the CPS sample in a given month. In all months, except for November and December, the CPS reference week is the period from Sunday to Saturday that contains the 12th of the month. Thus, depending on which day of the week the 12th day falls, the starting and ending points of the reference week vary. Moreover, in some cases in November and December, the reference week is pushed a week earlier than usual. Thus, for those states that distribute SNAP benefits on a fixed day of the month, the CPS reference week will sometimes be at the end of the benefit cycle, while in other time periods it will be the beginning of the benefit cycle.<sup>1</sup>

The fact that the starting and ending points of the reference week vary across years for the same calendar month coupled with the fact that for a given individual SNAP disbursement occurs on the same date each month, enables us to study whether there exist any transitory effects of SNAP timing on short-term labor supply. Thus, we can uncover the causal effect of SNAP timing on labor supply by comparing the weekly labor supply of SNAP eligible individuals who just received

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<sup>1</sup> For instance, in South Dakota, where benefits are issued to all recipients on the 10th day of the month, in cases when the reference week is the period between the 12th and the 18th day of the month, eligible individuals would have received SNAP benefits prior to the start of the reference week. In some Novembers and Decembers when the reference week is the period between the second and the eighth day of the month, eligible individuals in South Dakota would have last received benefits three weeks prior to the start of the reference week (on the 10th day of the previous month) and be at the end of the benefit cycle during the reference week.

their benefits (i.e. are at the start of their SNAP cycle) to that of SNAP eligible individuals about to receive their benefits (i.e. at the end of their SNAP cycle).

According to the permanent income hypothesis, known temporary changes in income should not alter consumption nor labor supply behavior. However, it is well documented that SNAP recipients' food consumption changes across the SNAP benefit cycle (Gregory and Todd, 2021). Beneficiaries redeem all or nearly all of their monthly benefits in the first two weeks after receiving their transfer (Cole and Lee, 2005; Castner et al., 2011) and are often left with insufficient nutrition before receiving their next benefits (Wilde and Ranney, 2000; Shapiro, 2005). Several studies find evidence of a reduction in expenditures, calorie intake, and diet quality at the end of the SNAP cycle (Wilde and Ranney, 2000; Shapiro, 2005; Hastings and Washington, 2010; Todd, 2015; Hamrick and Andrews, 2016; Whiteman et al., 2018; Kuhn, 2018; Goldin et al., 2022). Overall, the evidence suggests that SNAP households are unable to smooth consumption.

Likewise, it is possible that the timing of benefits could also affect labor supply. The direction of the effect for recipients about to receive their SNAP benefits as well as for recipients who just received them is ambiguous. At the end of the SNAP cycle, beneficiaries could work more in order to smooth consumption, or due to the physical and mental health impacts of reduced food consumption they may reduce their labor supply. Shortly after receiving the transfer, beneficiaries could increase their leisure consumption, as the transfer is a positive income shock (Yang, 2018; Powell, 2020), or could work more as they are now more physically and mentally able. Another channel through which SNAP payment timing may impact beneficiaries' labor supply is through its effect on their financial liquidity. If recipients are liquidity constrained, they may face a trade-off between food expenditures and other expenses that affect their ability to work including medical, child care, or transportation costs.<sup>2</sup> If this were to be the case, we should observe a reduction in beneficiaries' labor supply at the end of the SNAP cycle.

Our study shows that, at the extensive margin, labor supply is unaffected by the timing of SNAP benefits. Nevertheless, conditional on being employed, eligible individuals at the end of their SNAP cycle having lower labor supply. When compared to individuals at the start of the SNAP cycle, they are more likely to report an absence from work during the reference week. Additionally, part time workers are less likely to temporarily work full time at the end of the SNAP cycle. Finally we see some evidence of fewer reported hours worked. These transitory effects of the timing of SNAP disbursement on labor supply are larger for individuals with greater predicted benefit amounts and hold when we look across the same individuals over time. Our findings are consistent with the hypothesis that SNAP timing affects beneficiaries' short-term labor supply for reasons that have been previously shown to be sensitive to the timing of SNAP, such as recipients' health outcomes.

Our results on labor supply complement existing work on SNAP and health. The longer the time span since the last transfer, the more beneficiaries' food consumption and health deteriorate. Leveraging variation in SNAP timing, previous studies have documented an increase in ER usage (Cotti et al., 2020) and a negative effect on physical health and sleep quality (Farbmacher et al., 2022) at the end of the SNAP cycle. Relatedly, Arteaga et al. (2018) shows a decrease in pregnancy-related emergency room claims at the beginning of the SNAP cycle. Additional evidence highlight mental health-related problems by beneficiaries at the end of the SNAP cycle (Gregory and Todd, 2021; Gassman-Pines and Schenck-Fontaine, 2019). Poor health decreases individual's labor

<sup>2</sup> Studies have also shown a notable increase in grocery shopping on SNAP receipt days, which might alter household schedules and lead them to delay other household-related activities, including paid work (Hastings and Washington, 2010; Castellari et al., 2017).

supply and psychological distress and physical health problems predict work absence (Hardy et al., 2003; Peng et al., 2016; Bryan et al., 2021). Individuals may also make adjustments to their labor supply in response to partner's and children's health (Charles, 1999; Gould, 2004).

Our research also contributes to two strands of literature: the literature on the short-term, transitory labor supply effects to the timing of transfer payments and the aforementioned literature on the effects of SNAP timing.<sup>3</sup> To the best of our knowledge, Lee et al. (2022) is the only study analyzing the impact of the timing of SNAP benefits on labor supply, by comparing SNAP participants' and non-participants. However, SNAP participation is endogenous to the working decision and may correlate with other factors that determine individuals' working behavior within the month. Our study solves the endogeneity issue by exploiting variation among SNAP eligible individuals only.

In the context of a low-income country, Fernández and Saldarriaga (2014) focuses on beneficiaries' immediate labor supply response to the timing of a conditional cash transfer program in Peru and find that recipients reduce labor supply the week following the transfer date. On the other side, Angelucci et al. (2024) finds that household labor supply before/after receipt of a cash transfer in Mexico is unaffected.<sup>4</sup>

## 2. The supplemental nutrition assistance program

SNAP is the largest federal nutrition assistance program in the US, providing access to food to more than 40 million low-income Americans each month in 2021 (Center on Budget and Policy Priorities, 2019). SNAP reciprocity has been shown to lower poverty (Tiehen et al., 2012) and improve food insecurity (Ratcliffe et al., 2011). SNAP eligibility is determined at the federal level and is mostly a function of household size and income; although medical, dependent care, and shelter expenses as well as assets also matter for eligibility. Monthly SNAP benefits can only be used to purchase food and research has shown that there is not perfect fungibility (Smith et al., 2016; Hastings and Shapiro, 2018). Nevertheless, the benefits account for an important part of the household budget (Hoynes and Schanzenbach, 2015). For example, for a family of three, with one worker earning \$10 per hour and working 40 h per week, SNAP benefits increase income by 22% (Center on Budget and Policy Priorities, 2017).

While SNAP benefits amounts are determined at the federal level, states are given discretion over how and when to distribute benefits to their residents. Column 1 of Table 1 shows the SNAP distribution schedule by state. Eight states distribute benefits to all recipients on a single day each month. Among these, six states (Alaska, Idaho, Nevada, North Dakota, Rhode Island, and Vermont) distribute all benefits on the 1st day of the month,<sup>5</sup> New Hampshire distributes all benefits on

<sup>3</sup> Gennetian et al. (2016), Cotti et al. (2018) and Gassman-Pines and Bellows (2018) find an increase in student disciplinary infractions and decreased test scores at the end of the SNAP cycle. Bond et al. (2022) also find decreased test scores at the end of the SNAP benefit cycle. Carr and Packham (2019) show a raise in theft occurrences in the third and fourth week since benefit distribution. While Carr and Packham (2021) find that SNAP cyclicity affects domestic violence.

<sup>4</sup> A few papers study the intra-year labor market outcomes of certain annual transfer payment programs. Among these, Yang (2018) investigates the intra-year labor supply behavior of EITC recipients and finds that receiving a \$1000 EITC payment leads to a reduction in married women who work during the month that the payment is received by 1.6 percentage points. Bibler et al. (2019) study intra-year labor market responses in the context of the Alaska Permanent Fund and find evidence of an immediate positive labor demand and negative labor supply response. Finally, Powell (2020) studies the short-term labor supply response to the 2008 economic stimulus payments and finds a reduction in labor supply at the intensive margin during the month of the rebate receipt and the month after the receipt.

<sup>5</sup> Between September 2009 and July 2016 Idaho distributed all SNAP benefits on the 1st of the month. Starting in July 2016, Idaho started distributing SNAP benefits between the 1st and 10th of the month based on the last number of recipient's birth year.

**Table 1**  
SNAP distribution schedule and labor market statistics by state.

State	Monthly distribution window <sup>a</sup>	Labor supply			
		In labor force (2)	At work (3)	Temporarily full time (4)	Hours worked (5)
Alabama	4–23	0.44	0.97	0.01	33.97
Alaska <sup>b</sup>	1	0.51	0.93	0.02	32.10
Arizona	1–13	0.46	0.96	0.01	32.74
Arkansas	4–13	0.46	0.96	0.01	33.68
California	1–10	0.46	0.96	0.01	31.57
Colorado	1–10	0.55	0.96	0.01	32.51
Connecticut <sup>c</sup>	1–3	0.50	0.95	0.01	29.61
Delaware	2–23	0.51	0.96	0.01	32.58
District of Columbia	1–10	0.40	0.95	0.01	31.52
Florida	1–28	0.49	0.97	0.01	33.18
Georgia	5–23	0.49	0.96	0.01	33.62
Hawaii <sup>c</sup>	1–5	0.49	0.95	0.01	31.54
Idaho <sup>b</sup>	1 ; 1–10	0.58	0.96	0.01	32.61
Illinois	1–20	0.53	0.96	0.01	31.84
Indiana	5–23	0.50	0.96	0.01	32.93
Iowa	1–10	0.59	0.95	0.01	31.92
Kansas	1–10	0.57	0.97	0.01	33.21
Kentucky	1–19	0.43	0.96	0.01	32.95
Louisiana	1–14	0.46	0.96	0.01	34.21
Maine <sup>c</sup>	10–14	0.47	0.95	0.02	30.79
Maryland	4–23	0.47	0.95	0.01	32.16
Massachusetts	1–14	0.43	0.96	0.01	30.15
Michigan	3–21	0.49	0.96	0.02	31.71
Minnesota	4–13	0.57	0.95	0.01	31.29
Mississippi	4–21	0.44	0.96	0.01	34.49
Missouri	1–22	0.51	0.96	0.01	33.36
Montana <sup>c</sup>	2–6	0.56	0.95	0.01	32.36
Nebraska <sup>c</sup>	1–5	0.60	0.96	0.01	34.13
Nevada <sup>b</sup>	1	0.50	0.96	0.01	33.00
New Hampshire <sup>b</sup>	5	0.51	0.95	0.01	31.52
New Jersey <sup>c</sup>	1–5	0.53	0.96	0.01	31.28
New Mexico	1–20	0.47	0.96	0.01	32.34
New York	1–9	0.42	0.96	0.01	32.08
North Carolina	3–21	0.50	0.96	0.01	32.93
North Dakota <sup>b</sup>	1	0.58	0.96	0.01	33.83
Ohio	2–20	0.50	0.96	0.02	31.81
Oklahoma	1–10	0.48	0.96	0.01	33.84
Oregon	1–9	0.49	0.96	0.02	31.86
Pennsylvania <sup>b</sup>	by county	0.49	0.95	0.01	31.97
Rhode Island <sup>b</sup>	1	0.47	0.94	0.01	29.72
South Carolina	1–19	0.49	0.96	0.01	32.69
South Dakota <sup>b</sup>	10	0.58	0.96	0.01	33.98
Tennessee	1–20	0.46	0.96	0.01	32.65
Texas	1–15	0.51	0.96	0.01	33.97
Utah	5–15	0.58	0.96	0.01	31.96
Vermont <sup>b</sup>	1	0.51	0.95	0.01	31.26
Virginia	1–9	0.50	0.96	0.01	32.93
Washington	1–10	0.49	0.96	0.02	30.65
West Virginia	1–9	0.38	0.96	0.01	34.04
Wisconsin	2–15	0.57	0.95	0.01	31.39
Wyoming <sup>c</sup>	1–4	0.59	0.95	0.01	34.04

Notes: Column 1 displays the first and last possible day in which SNAP benefits can be distributed in a given month in each state. Columns 2–5 show labor market statistics for the SNAP eligible population. Columns 3, 4, and 5 further restrict to the employed SNAP eligible population.

<sup>a</sup> Between September 2009 and July 2016 Idaho distributed SNAP benefits on the 1st of the month. Starting in July 2016, Idaho distributed SNAP benefits between the 1st and 10th days of the month.

<sup>b</sup> Indicates states in the exact state.

<sup>c</sup> Indicates states in the extended sample with a disbursement window less than 5 days.

the 5th day of the month, and South Dakota distributes all benefits on the 10th day of the month. The remaining states stagger their benefits distribution over numerous days, but within a state each recipient receives benefits on the same day each month. In some states the disbursement window is narrow (e.g. Maine distributes benefits between the 10th and 14th day of the month by social security number), while other states have wide disbursement windows (e.g. Missouri distributes benefits between the 1st and the 22nd day of the month. The exact dates depends on birth month and the first letter of the recipients last name).

### 3. Data and sample

We use pooled cross-sectional data from the basic monthly Current Population Survey (CPS) starting with fiscal year 2005 (October 2004) until December 2018. We restrict the data to this time window for two reasons. First, we exclude data past 2018 because SNAP disbursement schedules were altered in the first four months of 2019 due to the government shutdown (Marks et al., 2022). Second, it is only from fiscal year 2005 onward that the USDA started providing the income thresholds for SNAP eligibility. Our analysis considers the sample of

US citizens 15–64 years of age because SNAP eligibility rules for immigrants and non-citizens changed over time and eligibility rules are more complex<sup>6</sup> and to avoid issues regarding the timing of social security benefits and retirement.

Identifying the effects of the timing of SNAP on labor supply requires information on SNAP reciprocity, as well as variation in the gap between SNAP disbursement and the CPS reference week. A limitation of the CPS is that it does not collect information about SNAP reciprocity or benefit amounts. However, it does contain enough information to construct an imperfect measure of SNAP eligibility since SNAP eligibility is mostly a function of household size and income. CPS respondents provide information on annual income of all persons related to the head of household.<sup>7</sup> The CPS data also provide information on the number of people in the household. Hence, similarly to [Castellari et al. \(2017\)](#) and [Marks et al. \(2022\)](#), we impute eligibility using the USDA gross income thresholds for each family size, adjusted for the cost of living, and published every fiscal year.<sup>8</sup> As annual family income is reported in bins in the CPS, our SNAP eligibility measure is conservative. For instance, in 2016, the income threshold for a five member family was \$36,936. We classify a CPS respondent in a five member family as eligible only if their reported income was below \$35,000 in 2016. The next income bin is \$35,000–\$40,000. This implies that individuals with an income above \$35,000 and below \$36,936, who were in fact eligible for SNAP, will not be identified as such. [Table 1](#) reports the average labor force participation rates, the likelihood of reporting for work during the reference week, if the respondents who normally works part time worked full time, and the hours worked across all jobs for SNAP eligible individuals by state.

The CPS does not provide information on the date of SNAP issuance, thus we limit the sample for the initial analysis to SNAP eligible respondents for whom we can identify the exact calendar day on which SNAP disbursement occurred.<sup>9</sup> As shown in the first column of [Table 1](#) seven states distribute SNAP benefits to all recipients on a single day each month for the entire sample period: Alaska, Nevada, New Hampshire, North Dakota, Rhode Island, South Dakota, and Vermont. We are able to add two additional states: Pennsylvania and Idaho. In Pennsylvania, each county distributes SNAP benefits based on its own schedule. A number of counties distribute all benefits on a single day each month. In Beaver county benefits are distributed on the 3rd day of the month, in Butler county benefits are distributed on the 2nd day of the month, and in Lebanon county benefits are distributed on the 6th day of the month. We were able to include respondents in these counties in our sample.<sup>10</sup> Between September 2009 and July 2016 Idaho distributed

<sup>6</sup> Results, available upon request, are robust to the inclusion of data for non-citizens.

<sup>7</sup> 23.14% of the households included in the sample have an individual or more living in the household who is/are not a member of the household head's family. As the actual annual income of such individuals is unknown, eligibility cannot be imputed for them. Hence, we restrict the sample to individuals that are part of the householder's family. When including these individuals (who make up for 8.57% of individuals in the sample), results (available upon request) are mostly unchanged.

<sup>8</sup> Some households that we categorize as eligible will be ineligible for benefits due to other details of the SNAP eligibility formula. In addition to having gross income below 130% of the federal poverty level, families are generally eligible for SNAP if their net income is below 100% of the federal poverty level. Households are allowed to deduct 20% of earned income, dependent care, medical, and some housing expenses from their income to determine net income. There is also an asset threshold that denies benefits to some otherwise eligible individuals. These extra rules will lead us to falsely classify some households as eligible who are actually ineligible and will attenuate our findings.

<sup>9</sup> Information on the SNAP disbursement schedules for each state is made available by the United States Department of Agriculture see <https://fns-prod.azureedge.us/sites/default/files/resource-files/snap-monthly-issuance-schedule-all-states-032224.pdf>.

all SNAP benefits on the 1st of the month. Starting in July 2016, Idaho started distributing SNAP benefits between the 1st and 10th days of the month based on the last number of recipient's birth year. In our analysis, we include observations from Idaho starting in September 2009. We limit to non-married residents of Idaho so that we can use age of the household head to infer birth year which in turn determines SNAP reciprocity date. In all other states the exact day of benefit receipt is determined by a piece of information not available to us (i.e. social security number; case number, recipient's last name). In a robustness check we extend the sample to include states with narrow disbursement windows and our results hold (see [Section 5.1](#)).

[Table 2](#) reports summary statistics. Column 1 shows our initial sample: SNAP eligible individuals for whom we can determine the exact calendar day of distribution. Column 2 (extended sample) adds to the sample in column 1, SNAP eligible individuals who reside in states with narrow disbursement windows (up to five days). Column 3 considers individuals whose household income is in the income bin just above the SNAP income threshold given their family size and who reside in areas for which we can exactly identify the distribution day. Finally, column 4 shows summary statistics for SNAP eligible individuals who reside in excluded states, i.e. individuals not included in the exact state sample. As shown in Panel A, the exact state sample and the extended sample are very similar in terms of labor market statistics: 53% of the SNAP eligible individuals in both samples report being in the labor force during the reference period and about 43% reports being employed. In both samples, hours worked are about 32 h a week. Consistent with SNAP being a means-tested program individuals in our sample are fairly low-educated are have low rates of marriage. Predicted SNAP benefits are around \$350 a month.

Near-eligible individuals (column 3) have higher labor force participation, employment rates, and hours worked, but appear similar to SNAP eligible individuals in terms of the rate of being at work and the rate of temporarily working full time during the reference week. As expected, near-eligible individuals are more educated, live in smaller families, and are less likely to have a child at home. As comparison of columns 1 and 4 shows that, labor force participation and employment rates are higher for the states in our analysis but average hours of work are similar. The individuals in our sample are not representative of the SNAP population at large. Consistent with having higher labor force participation rates, the SNAP eligible individuals in our sample are more likely to be white and have higher education levels. Age, gender and family composition, however, are similar. In [Section 5.1](#) we address concerns about the representativeness of our sample.

#### 4. Empirical strategy

Our identification strategy exploits variation arising from the irregular structure of the calendar year to study the sensitivity of weekly labor market activity at different times during the SNAP benefit cycle.<sup>11</sup> In the CPS, each month a random sample of the US population is asked questions about labor market activities for the week prior to the interview week, which is called the reference week. While SNAP disbursement occurs on the same day every month, the start and end dates of the CPS reference week vary due to its design.<sup>12</sup> In particular, according to the Bureau of Labor Statistics “The reference week

<sup>10</sup> Respondents in other counties where benefits are distributed on a single day each month in Pennsylvania are not included in the sample because in order to preserve confidentiality those counties are not identified in the CPS data.

<sup>11</sup> Other papers have used a similar empirical strategy to explore the impact of the timing of social security payments on payday loans use and prescription fills ([Leary and Wang, 2016](#); [Gross et al., 2022](#)).

<sup>12</sup> The rules governing the timing of the CPS reference week were established with the start of the CPS. See <https://www.bls.gov/cps/definitions.htm>.

**Table 2**  
Summary statistics.

	Exact states sample (1)	Extended sample (2)	Near-eligible individuals (3)	Excluded states (4)
<i>Panel A: Labor market statistics</i>				
In labor force	0.53 (0.50)	0.53 (0.50)	0.74 (0.44)	0.49 (0.50)
Employed	0.43 (0.50)	0.43 (0.50)	0.69 (0.46)	0.39 (0.49)
At work	0.95 (0.21)	0.95 (0.21)	0.96 (0.19)	0.96 (0.20)
Temporarily full time	0.01 (0.11)	0.01 (0.11)	0.01 (0.09)	0.01 (0.11)
Hours worked	32.36 (16.75)	32.28 (16.75)	36.06 (15.46)	32.60 (14.90)
<i>Panel B: Demographic characteristics</i>				
Age	36.90 (15.00)	37.24 (15.01)	39.16 (14.80)	36.83 (15.05)
Female	0.56 (0.50)	0.56 (0.50)	0.52 (0.50)	0.57 (0.49)
White	0.77 (0.42)	0.77 (0.42)	0.89 (0.31)	0.68 (0.47)
Hispanic	0.08 (0.27)	0.08 (0.28)	0.05 (0.22)	0.14 (0.35)
Married	0.28 (0.45)	0.30 (0.46)	0.42 (0.49)	0.30 (0.46)
Presence of children	0.40 (0.49)	0.41 (0.49)	0.38 (0.49)	0.41 (0.49)
Family size	3.20 (1.98)	3.21 (1.98)	2.72 (1.36)	3.30 (1.92)
Less than high school	0.27 (0.44)	0.26 (0.44)	0.16 (0.37)	0.31 (0.46)
High school graduate	0.36 (0.48)	0.37 (0.48)	0.36 (0.48)	0.36 (0.48)
Some college or more	0.37 (0.48)	0.37 (0.48)	0.48 (0.50)	0.33 (0.43)
Predicted benefit amount	353.15 (272.31)	354.33 (272.56)	0 –	361.17 (260.03)
Observations	129,185	258,585	55,005	1,265,375

Notes: Column 2 adds SNAP eligible individuals from states with a short disbursement window. Column 3 shows individuals just above the SNAP income eligibility threshold given their family size. Column 4 includes SNAP eligible individuals residing in all states not included in column 1. The predicted benefit amounts are in 2019 dollars. At work, temporarily full time, and hours worked are conditional on being employed. Standard deviation in parenthesis.

usually is the 7-day calendar week (Sunday-Saturday) that includes the 12th of the month, with occasional exceptions<sup>13</sup>. The exceptions occur in November and December where the reference week is sometimes moved one week earlier so that interviews do not occur during major holiday periods. For December, if the calendar week including the 5th is contained entirely within the month of December, the December reference week will be one week earlier than normal. For November, the reference week will be moved one week earlier if Thanksgiving falls during the week that contains the 19th.<sup>13</sup>

Fig. 1 illustrates the timing of the CPS reference week for each month for the calendar years of 2014 and 2017. The bordered blocks indicate all the different CPS reference weeks that occurred each month during these years. As Fig. 1 shows, the reference weeks for January through October vary between the 6th to the 12th day of the month (April 2014 and Aug 2017) and 12th-18th of the month (Oct and Jan 2014 ; March 2017). 2017 is a year in which the November and December reference weeks occurred early due to timing of the holidays. The November reference week goes from the 5th to the 11th while the December reference week goes from the 3rd to the 9th. Our empirical strategy relies upon this variation, which makes it possible to observe weekly labor market activity at different times during the SNAP benefit cycle.

<sup>13</sup> The November reference week is also moved one week earlier if the Census Bureau determines that there is not enough data processing time before the survey interview week for December.

Overlaid on Fig. 1 are colored numbers referring to the SNAP disbursement dates for the states in the sample. SNAP disbursement dates are colored differently based on their timing relative to the reference week. Dates in yellow correspond to benefits received 14–21 days prior to the end of the reference week. Dates in green correspond to benefits received seven to fourteen days prior the end of the reference week. Dates in blue indicate that benefits were received in the first four days of the reference week, while dates purple indicates transfer payments arrived during the last three days of the reference week. Finally, dates in red corresponds to SNAP benefits received in the week following the reference week (i.e. the end of the SNAP cycle).

Consider a state that distributes SNAP benefits on the 10th day of the month. Within a year we observe movement in the timing of SNAP disbursement relative to the reference week. For instance, in December 2017 the reference week precedes the SNAP disbursement date, while the reference week is after the disbursement date in February, March and June of that year. Additionally, for a given calendar month, we also use variation in the timing of benefit relative to the reference week across years. For instance, the SNAP disbursement in December 2014 occurs early in the reference week, while in December 2017 the reference week precedes the SNAP disbursement date. As the CPS monthly survey collects labor market data for the reference week, the labor supply response to the timing of SNAP benefit can be identified by comparing labor supply across months. Identification stems from the fact that the time gap between SNAP disbursement and the start of the CPS reference week varies only due to the design of the CPS sample framework.

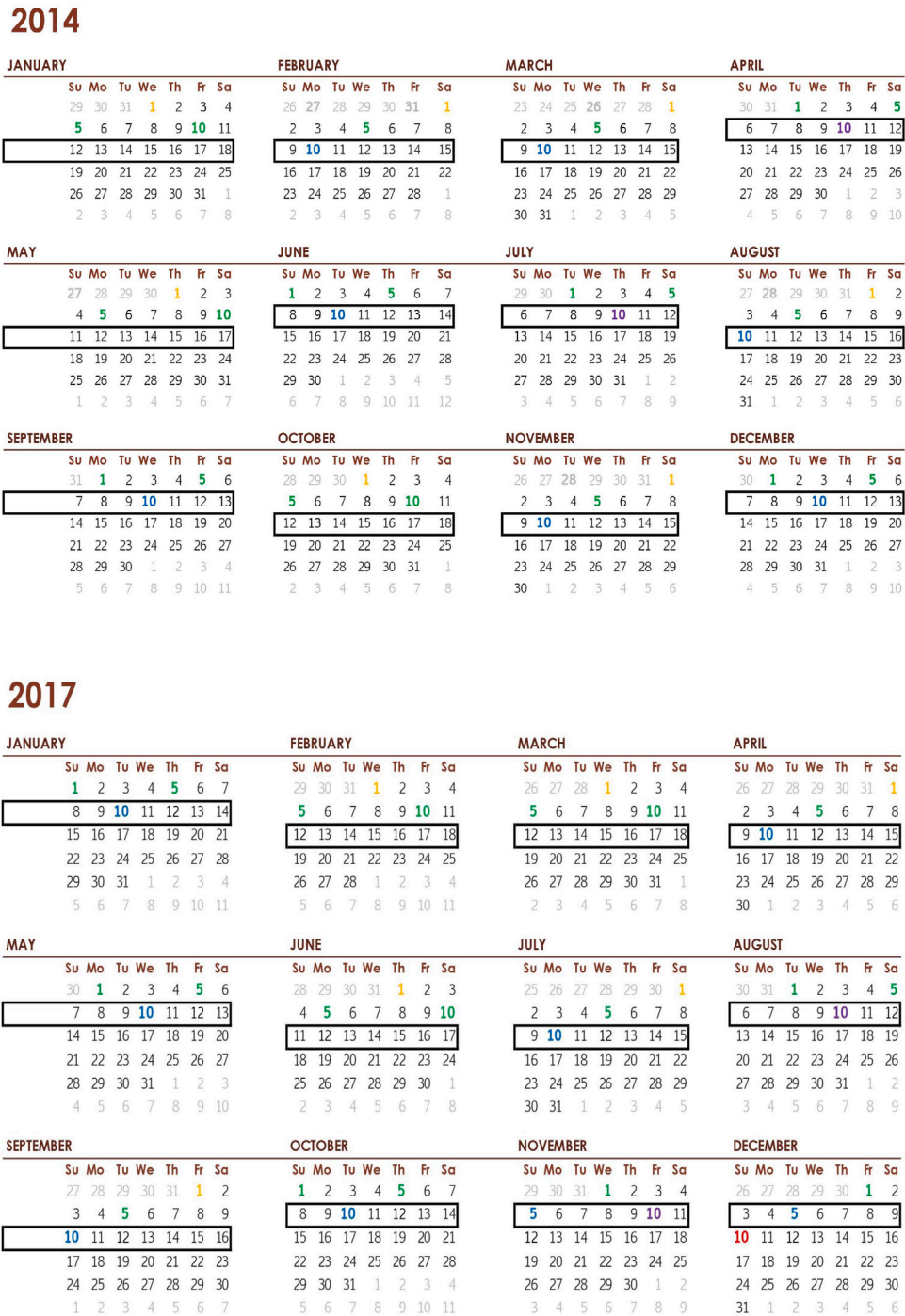


Fig. 1. CPS reference weeks and SNAP disbursement dates. Notes: The boarded weeks are the CPS monthly reference weeks. Yellow denotes that disbursement occurred two weeks prior to the start of the reference week (14–21 days before). The green color denotes SNAP disbursement that occurred within a week prior to the start of the reference week. Blue denotes SNAP disbursement that occurred during the first four days of the reference week (1–4 days into). Purple denotes SNAP disbursement that occurred during the last three days of the reference week (5–7 days into). Red indicates SNAP disbursement occurred in the week following the reference week (1–7 days after).

To explore whether SNAP eligible individuals alter their labor supply in response to the timing of benefit receipt, we estimate the following equation:

$$\begin{aligned}
 Y_{rsm_y} = & \alpha + \beta_1(14-21days)Before_{sm_y} + \beta_2(1-4days)Into_{sm_y} \\
 & + \beta_3(5-7days)Into_{sm_y} \\
 & + \beta_4(1-7days)After_{sm_y} + X_{rsm_y} + r_s + \gamma_m + \zeta_y + \eta_{sm} \\
 & + \lambda_{s_y} + \epsilon_{rsm_y}
 \end{aligned}
 \tag{1}$$

where  $Y_{rsm_y}$  measures the labor supply for CPS respondent  $r$ , residing in state  $s$ , during the reference week of month  $m$ , in year  $y$ .<sup>14</sup> We consider five measures of labor supply: two at the extensive margin

<sup>14</sup> Since the CPS respondents are interviewed multiple times some respondents will appear in our analysis sample more than once. In Section 5.1, we exploit the panel nature of the CPS as a robustness check.

and three at the intensive margin. At the extensive margin we construct binary indicators for labor force participation and employment. At the intensive margin we consider total hours of work across all jobs.<sup>15</sup> We also use survey questions about work status to construct two binary variables that enable us to detect short-time changes in labor supply. The first dummy variable takes value one if a respondent who regularly works part time at their main job reports working full time in the reference week.<sup>16</sup> The second dummy takes value 0 if the respondent is regularly employed at their main job, but is absent from work at this job during the reference week.

As the CPS sample is asked about their labor supply during the seven days of the reference week, we construct four indicator variables measuring the timing of SNAP disbursement relative to the reference week in a given state, month, and year. In particular,  $14-21daysBefore_{smy}$  denotes benefits arrival 14–21 days before the end of the reference week, i.e. the middle of the SNAP benefit cycle.  $1-4daysInto_{my}$  and  $5-7daysInto_{my}$  denote benefits distribution during the first four days and last three days of the reference week, respectively. We consider separately when benefits are distributed during the first half (i.e.  $1-4daysInto_{my}$ ) or the second half (i.e.  $5-7daysInto_{my}$ ) of the reference week because, due to the nature of SNAP, receiving benefits earlier or later in the reference week might have a different effect on labor supply during that week. That is because individuals who receive benefits during the latter half of the reference week may have tight budgets for a greater number of days during this week compared to individuals who receive benefits early into the reference week.  $1-7daysAfter_{my}$  is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle).<sup>17</sup> We use the beginning of the SNAP cycle (i.e. 7–14 days before the end of the reference week) as the omitted category, since individuals should be the least budget constrained during this week as they received benefits within a week prior to the start reference week.  $r_s$  are state fixed effects which account for any time-invariant differences in labor supply between the different states in the sample.  $\gamma_m$  are calendar month fixed effects which account for fixed differences in labor supply across different months,  $\zeta_y$  are year fixed effects controlling for any differences in labor supply between different years.  $X_{rsmy}$  includes the following covariates: age, age squared, female dummy, marital status indicators, race indicators, education level indicators, indicators for having children and having children under age 5, an indicator for Hispanic origin, family income and family size dummies, as well as the state-level monthly unemployment rate.

Due the CPS design much of our variation occurs in the months of November and December. Hence, it might be the case that the differences we see in labor supply are not due to the timing of the SNAP benefits distribution, but are due to differences in labor supply/demand in winter month in states that have late distributions compared to states with early distribution schedules. For example, individuals in South Dakota often receive their benefits after the reference week in winter months and in this state there might be lower labor supply/demand

due to seasonal employment patterns. For this reason, in most specifications, we include state-by-month fixed effects,  $\eta_{sm}$ , to control for seasonal effects by state, and state-by-year fixed effects ( $\lambda_{sy}$ ) to control for year-by-year changes at the state level. In addition, we also include in  $X_{rsmy}$  information on two environmental factors that are common in the winter (influenza rate and snowfall) which could be spuriously correlated with the timing of the reference week.<sup>18</sup> In all specifications standard errors are clustered at the state level. Our identifying assumption is that this variation in the timing of disbursement benefits relative to the reference week is uncorrelated with other determinate of labor supply.

The  $\beta$  coefficients measure the effect SNAP timing on labor supply. Each coefficient should be interpreted as the effect of a given distance between the SNAP disbursement and the CPS reference week relative to having received benefits the week prior to the reference week (i.e. the start of the SNAP benefit cycle). Previous studies established that SNAP beneficiaries consume more calories, eat more nutritious food, and are less likely to experience an ER visit shortly after receiving benefits compared to the period at the end of the cycle. Thus, individuals may be more able work shortly after benefits distribution relative to the end of the benefit cycle, implying a negative sign for  $\beta_3$  and  $\beta_4$ . Moreover, the negative effect on labor supply may be greater for individuals who received their SNAP benefits shortly after the reference week compared to individuals who received them late in the reference week. That is because the benefits' arrival for the latter group may enable them to increase labor supply compared to individuals who are at the end of the SNAP cycle. If this is the case, then we should observe  $\beta_4 < \beta_3 < 0$ . Conversely, if individuals were to feel more resourceful and able to afford more leisure shortly after receiving their SNAP benefits, then we should observe a positive sign on  $\beta_3$  and  $\beta_4$ . These effect should be more pronounced at the end of the benefit cycle implying  $0 < \beta_3 < \beta_4$ .

## 5. Results

**Table 3** reports the effects SNAP benefits disbursement on short-term labor supply at the extensive margin. The odd columns exclude state-month fixed effects and state-year fixed effect, while the even columns include these fixed effects. There are no statistically significant effects on the probability of being in the labor force or the probability of being employed. This lack of effect of SNAP timing on labor supply is consistent with extensive margin adjustments being costly. Although SNAP benefits are an important part of monthly family income, the amounts are likely not sufficient to move individuals in and out of employment or the labor force.

Next, **Table 4** shows the impact of SNAP timing on labor supply at the intensive margin. Columns 1 and 2 show the likelihood of being at work during the reference week with and without state-month fixed effects and state-year fixed effect. Reassuringly, the results are robust to a rich set of fixed effects. In the full specification (Column 2), conditional on being employed, receiving SNAP benefits during

<sup>15</sup> For all workers above the 99th percentile of the hours distribution we assign the 99th percentile.

<sup>16</sup> The Bureau of Labor and Statistics has collected this measure of labor supply since 1976. In 2004, 36.4 million salaried workers (or 30% of all such workers) had some flexibility over their work hours (McMenamin, 2007). Recent work documents that there are a significant number of transition between part-time to full-time work and that the vast majority occur within the same employer (Borowczyk-Martins and Lalé, 2019).

<sup>17</sup> As all individuals in the exact state sample receive their disbursement within 3 days of the end of the reference week, the variable  $1-7daysAfter_{my}$  the end of the reference week can also be interpreted as the effect of receiving benefits  $1-3daysAfter_{my}$  the end of the reference week. Additionally, 0.6% of respondents report labor supply at the end of the SNAP cycle. This percentage increases to over 3% when limiting the observations to the months of November and December.

<sup>18</sup> We collected weekly data on influenza activity by state from the U.S. Influenza Surveillance Reports produced by the CDC. This data is available by state beginning in September 2008. The variable measuring influenza activity takes one of five values: minimal, low, moderate, high, insufficient data (see CDC (2024) for additional information). Information on snowfall is from NOAA's National Centers for Environmental Information (see Oceanic and Administration (2024)). This data is available at the regional level for all states in our sample with the exception of Alaska (for Alaska, the snowfall index equals the mean snowfall index across all other states in the sample) and Hawaii. This data provides information on the severity and start and end day during which a storm was observed in a particular region. The severity level falls into one of five regional-specific values: notable, significant, major, crippling, or extreme. If a storm of any level was observed for at least one day during the reference week in the region where a state is located, we assign that value to that state; otherwise we assign zero.

**Table 3**  
Effects of SNAP timing on labor supply at the extensive margin.

	In the labor force		Employed	
	(1)	(2)	(3)	(4)
SNAP issuance occurred:				
14–21 days <i>before</i> the end of the reference week	0.002 (0.003)	0.003 (0.003)	0.002 (0.002)	0.004 (0.002)
1–4 days <i>into</i> the reference week	0.003 (0.006)	0.004 (0.005)	0.001 (0.006)	0.000 (0.008)
5–7 days <i>into</i> the reference week	0.002 (0.009)	0.000 (0.005)	0.005 (0.006)	0.005 (0.007)
1–7 days <i>after</i> the end of the reference week	0.017 (0.019)	–0.004 (0.007)	0.012 (0.008)	0.014 (0.009)
Year fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
State-month fixed effects	No	Yes	No	Yes
State-year fixed effects	No	Yes	No	Yes
Observations	129,185	129,185	129,185	129,185
Mean dependent variable	0.526	0.526	0.431	0.431
R <sup>2</sup>	0.144	0.147	0.143	0.146

Notes: The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table 4**  
Effects of SNAP timing on labor supply at the intensive margin.

	At work		Temporarily full time		Hours worked	
	(1)	(2)	(3)	(4)	(5)	(6)
SNAP issuance occurred:						
14–21 days <i>before</i> The end of the reference week	0.003 (0.003)	0.002 (0.003)	0.001 (0.001)	0.001 (0.001)	–0.058 (0.236)	–0.082 (0.239)
1–4 days <i>into</i> The reference week	–0.002 (0.004)	–0.004 (0.003)	0.001 (0.001)	0.003* (0.001)	0.228 (0.330)	0.126 (0.300)
5–7 days <i>into</i> The reference week	–0.009* (0.004)	–0.011** (0.004)	0.002 (0.001)	0.000 (0.001)	0.426 (0.243)	0.443** (0.189)
1–7 days <i>after</i> The end of the reference week	–0.021*** (0.005)	–0.025*** (0.005)	–0.008** (0.003)	–0.015*** (0.002)	–0.803 (0.658)	–0.405 (0.379)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State-month fixed effects	No	Yes	No	Yes	No	Yes
State-year fixed effects	No	Yes	No	Yes	No	Yes
Observations	55,734	55,734	55,734	55,734	55,734	55,734
Mean dependent variable	0.952	0.952	0.013	0.013	32.241	32.241
R <sup>2</sup>	0.010	0.015	0.003	0.006	0.094	0.102

Notes: The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

the last three days of the reference week reduces the probability of being at work during that week by 1.1 percentage points relative to receiving benefits shortly before the start of the reference week. In line with our predictions the magnitude of the effect is large for those

who receive benefits shortly after the reference week has passed as opposed to at the end of the reference week. Receiving benefits in the week after the reference week reduces the probability of being present at work during the reference week by 2.5 percentage points.

**Table 5**  
Robustness check: Effects of SNAP timing on labor supply.

	Near-eligible individuals (1)	Eligible individuals by predicted benefit amounts:	
		Below median (2)	Above median (3)
<i>Panel A: At work</i>			
SNAP issuance occurred:			
14–21 days before	–0.001 (0.002)	0.001 (0.003)	0.003 (0.003)
The end of the reference week			
1–4 days into	0.001 (0.003)	–0.003 (0.003)	–0.006 (0.006)
The reference week			
5–7 days into	–0.003 (0.002)	–0.006 (0.003)	–0.018** (0.007)
The reference week			
1–7 days after	–0.008 (0.005)	–0.020*** (0.003)	–0.034*** (0.008)
The end of the reference week			
Mean dependent variable	0.961	0.949	0.955
<i>Panel B: Temporarily full time</i>			
SNAP issuance occurred:			
14–21 days before	–0.001 (0.001)	–0.002 (0.002)	0.004*** (0.001)
The end of the reference week			
1–4 days into	0.001 (0.002)	0.001 (0.001)	0.004 (0.003)
The reference week			
5–7 days into	–0.001 (0.003)	0.002 (0.002)	–0.002 (0.002)
The reference week			
1–7 days after	–0.005 (0.007)	–0.015*** (0.003)	–0.015*** (0.002)
The end of the reference week			
Mean dependent variable	0.009	0.013	0.013
<i>Panel C: Hours worked</i>			
SNAP issuance occurred:			
14–21 days before	0.352 (0.219)	–0.340 (0.278)	0.122 (0.267)
The end of the reference week			
1–4 days into	–0.006 (0.342)	0.313 (0.418)	–0.100 (0.293)
The reference week			
5–7 days into	–0.045 (0.261)	0.911*** (0.207)	–0.293 (0.238)
The reference week			
1–7 days after	–0.097 (0.460)	–0.180 (0.495)	–1.287*** (0.214)
The end of the reference week			
Mean dependent variable	35.966	31.674	32.814
Year fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes
Observations	37,748	27,975	27,759
Predicted benefit amounts	–	150.482	563.319
R <sup>2</sup>	0.099	0.090	0.149

Notes: In all columns the sample is restricted to employed individuals. At work is an indicator variable that takes value 0 if the individual is regularly employed at their main job, but is absent from work during the reference week. Temporarily full time is an indicator that takes value one if the individual regularly working part time at their main job reports working full time in the reference week. Refer to Table 3 for variable definitions and additional controls. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

As only around 80% of all SNAP eligible individuals participate in the program (Cunningham, 2021), our results should be considered as intent-to-treat effects.<sup>19</sup> The effects on SNAP recipients would therefore be greater. These findings imply that labor supply is lower at the end of the benefit cycle compared to its start.

Columns 3 and 4 show the impact of SNAP timing on substituting between full and part time work. Consistent with labor supply being lower at the end of the SNAP benefit cycle, we see that individuals who receive SNAP in seven day period following the reference week are less likely to shift to full time work, when regularly working part time. Our results support the hypothesis that being at the end of the SNAP cycle adversely impacts labor supply indirectly through its transitory effects

<sup>19</sup> Studies have documented that eligible households fail to enroll in SNAP and otherwise eligible recipient households are removed from the program for failure to re-verify eligibility (Gray, 2019; Finkelstein and Notowidigdo, 2019).

on other outcomes, such as physical and mental health and stress as documented by a large literature.<sup>20</sup> Columns 5 and 6 show the impact on hours worked. Overall, these estimates are inconsistent with the findings from the other two measures of labor supply. This may be due to a combination of recall bias and measurement error. With the exception of hours worked, our labor supply estimates highlight that the timing of SNAP benefits disbursement impacts individuals' labor supply on the intensive margin.

<sup>20</sup> Prior research on SNAP recipients' behavior documents additional alcohol consumption associated with distribution of SNAP benefits during weekend days (Castellari et al., 2017; Cotti et al., 2018). To test the sensitivity of the results to possible altered behavior due to benefit receipt on a weekend, we create an indicator variable equal to one if SNAP distribution occurs on the weekend in month  $m$  of year  $y$ . Results in Table A.1 are robust to the inclusion of this indicator for weekend issuance and there are no effects of this variable on the outcomes of interest.

### 5.1. Robustness checks

The changes in labor supply we observe might not be due to the SNAP cycle, but to unobserved shocks in the labor market that coincide with the state-months when disbursement occurs towards the end of the SNAP cycle. To investigate this, we estimate Eq. (1) for the sample of near-eligible individuals, i.e. those living in households with annual income just above the SNAP eligible threshold for their household size. Near-eligible individuals are similar to eligible individuals but their labor supply should be unaffected by the timing of SNAP distributions given that they do not qualify for the benefits. If our results are driven by unobserved factors, we should also observe effects for this group of individuals. If instead the effects are due to the timing of the SNAP cycle, then the distance between SNAP disbursement and the reference week should not affect the labor market outcomes for near-eligible individuals. Table 5, column 1, shows no statistically significant effects of the end of the SNAP cycle on our measures of labor supply: the likelihood of being at work, the odds of temporarily working full time, or total hours of work during the reference week for near-eligible individuals.

Next, the effect of SNAP timing on labor market behavior should be more pronounced for individuals who are eligible for higher benefit amounts. To compute predicted benefits we mimicked the official guidelines as best as we could. We started with an estimate of monthly gross income (we assigned households the median of their prior year's income bin divided by 12) and then subtract 20% of earned income. For all households we then subtract that year's standard deduction for a three-person household (information on the standard deduction is taken from <https://www.fns.usda.gov/snap/allotment/COLA>.) For households with dependent children under the age of 5 we allocate a dependent care deduction of \$175 per kid (the maximum amount until 2008- see <https://www.cbpp.org/research/the-food-stamp-dependent-care-deduction>). This generates an estimate of adjusted income for each household in our sample. Finally, we account for the excess shelter costs. We use annual state-level estimates of shelter costs taken from <https://www.rentdata.org/states> and assume that households live in a 2-bedroom unit. If shelter costs are more than half of adjusted income, we subtract the excess amount up to a shelter cap limit of \$490 (the maximum shelter deduction in 2014) to compute our estimate of net monthly income. Finally, we combine our estimate of net income with information on the maximum SNAP allotment given family size to produce our estimate of predicted benefits. Then, we estimate Eq. (1) separately for eligible working respondents with predicted benefit amounts above and below the median predicted allotment. The results of the exercise are shown in columns 2 and 3 of Table 5. Consistent with the hypothesis that at the end of the SNAP benefits cycle individuals with larger expected transfers should have a greater reduction in labor supply, Table 5 shows that effects are concentrated among individuals with predicted benefits above the median.

In particular, as shown in Panel A, individuals with predicted SNAP benefits above the median who receive their benefits in the week following the reference week, experience a decrease in the probability of being at work during the reference week of 3.4 percentage points. The corresponding estimate for individuals with predicted benefits below the median is only 2 percentage points. Additionally, there is a reduction in labor supply when benefits are received in the latter half of the reference week, only for individuals with high predicted benefit amounts. Next, Panel B, suggests that both groups see a 1.5 percentage points reduction in the probability of switching from part to full time work at the end of the SNAP benefit cycle. Finally, while not statistically significant, reported hours worked fall by only 0.18 h for individuals with predicted benefits below the median who receive their benefits shortly after the reference week, while there is a statistically significant 1.3 h reduction for individuals with high predicted benefits.

Next, we exploit the monthly panel design of the CPS. In particular, households are interviewed for four months, exiting the survey in

the next eight months, and returning again for four months before being permanently dropped out of the survey. Thus, we can observe the survey responses of the majority of individuals in the sample at least twice, making it possible to control for unobserved individual characteristics that do not change over time. Using the subsample of individuals for which we have at least two observations, we estimate Eq. (1) and include individual fixed effects. The results of this exercise are shown in Table 6. Column 1 suggests that even after controlling for time-invariant unobserved individual characteristics, being at the end of the SNAP cycle reduces the probability of being present at work during the reference week compared to individuals who are at the start of the SNAP cycle. There is 3.2 percentage points reduction when benefits arrive after the reference week and a 1.2 percentage points reduction when the payment arrives in the second half of the reference week. A reduction in labor supply at the end of the SNAP cycle is also observed for the two other measures of labor supply presented in columns 2 and 3. The same individuals report working 1.1 fewer hours a week at the end of the SNAP cycle compare to their report hours worked at the beginning of SNAP cycle.

As discussed above, most of the states distribute SNAP over a wide window of days and therefore the distance between the SNAP disbursement and the reference week cannot be assigned. However, seven states have benefits disbursement windows that are 5 days or less (as shown in Table 1). In these states, SNAP distribution occurs uniformly within the disbursement window according to factors unrelated to labor supply. For instance, New Jersey distributes SNAP between the 1st and 5th day of the month based on the 7th digit of recipient's case number.<sup>21</sup> To test the robustness of the main results and increase external validity, we add the states with short disbursement schedules to the main sample. As we lack information on the exact SNAP disbursement date for each recipient, we assign the first day of the disbursement window in each state as the disbursement date to all recipients in that state. This procedure guarantees that everyone classified as receiving SNAP benefits after the reference week did indeed receive them after the reference week. However, in some instances, we will falsely classify some individuals as receiving their SNAP disbursement 5–7 days into the reference week, while the actual disbursement happened after the reference week. A similar misclassification will occur for those individuals receiving benefits 1–4 days into the reference week.<sup>22</sup> However, as the longest disbursement window is five days, measurement bias is unlikely to be a concern.

Table 7 shows the estimates of this exercise. The effect of SNAP timing on being present at work during the reference week holds. In particular, being at the end of the SNAP cycle reduces the probability of being present at work during that week by 2.3 percentage points compared to receiving benefits shortly prior to the start of the reference week, while receiving benefits 5–7 days into the reference week is associated with a 1 percentage point reduction in the likelihood of

<sup>21</sup> Other states with short disbursement windows include Connecticut, Hawaii, Nebraska, Montana, Maine, and Wyoming. SNAP distribution in Connecticut occurs between the 1st–3rd of the month based on the first letter of the head of household's last name. In Hawaii, benefits are made available on the 3rd and the 5th of every month, based on the first letter of the recipient's last name, while deposit cash benefits are distributed on the first day of every month. In Nebraska, SNAP is distributed between the 1st–5th of the month based on the last digit of the head of household's social security number. SNAP issuance in Montana occurs between the 2nd–6th of the month based on the last digit of the SNAP case number. Maine sends out benefits between the 10th–14th of the month based on the last digit of the recipient's birth day. In Wyoming benefits are made available between the 1st–4th of the month based on the first letter of recipient's last name.

<sup>22</sup> These instances of misclassification cause the estimate on the 1–4 and 5–7 days into the reference week to be more negative than the true estimate. As a robustness check, if we instead assign as the distribution date the median day of the disbursement window the coefficient estimates are attenuated.

**Table 6**  
SNAP timing and labor supply (CPS panel).

	At work (1)	Temporarily full time (2)	Hours worked (3)
SNAP issuance occurred:			
14–21 days <i>before</i> The end of the reference week	0.002 (0.003)	–0.001 (0.001)	–0.082 (0.140)
1–4 days <i>into</i> The reference week	–0.006*** (0.001)	0.000 (0.001)	–0.282 (0.169)
5–7 days <i>into</i> The reference week	–0.012*** (0.003)	–0.003 (0.002)	–0.210 (0.182)
1–7 days <i>after</i> the end of the reference week	–0.032*** (0.007)	–0.019*** (0.005)	–1.097*** (0.292)
Individual fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes
Observations	51,569	51,569	51,569
Mean dependent variable	0.954	0.130	32.480
R <sup>2</sup>	0.014	0.007	0.015

Notes: Observations are limited to SNAP eligible individuals who are employed and for whom there exist at least two sample observations. The omitted category is receiving benefits within a week prior to the start reference week, (i.e. labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table 7**  
Effects of SNAP timing on labor supply (Extended sample)

	At work (1)	Temporarily full time (2)	Hours worked (3)
SNAP issuance occurred:			
14–21 days <i>before</i> The end of the reference week	0.000 (0.002)	0.000 (0.001)	–0.037 (0.122)
1–4 days <i>into</i> The reference week	–0.004* (0.002)	0.002** (0.001)	0.088 (0.168)
5–7 days <i>into</i> The reference week	–0.009** (0.003)	–0.001 (0.001)	0.061 (0.322)
1–7 days <i>after</i> The end of the reference week	–0.023*** (0.005)	–0.009* (0.005)	–0.636** (0.231)
Year fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes
Observations	112,409	112,409	112,409
Mean dependent variable	0.953	0.013	32.162
R <sup>2</sup>	0.013	0.006	0.102

Notes: The extended sample adds to the exact state sample SNAP eligible individuals who reside in CT, HI, ME, MT, NE, NJ, and WY (states with distribution windows less than 5 days). In all columns the sample is restricted to employed individuals. The omitted category is receiving benefits within a week prior to the start reference week, (i.e. labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

being at work. For the extended sample of states we also see a reduction in hours worked of 0.6 h for workers at the end of the SNAP cycle.

Next, only three states in our extended sample South Dakota, Maine, and Idaho (for part of the sample) distribute SNAP benefits into the

**Table 8**  
Effects of SNAP timing on work absence by absence reasons.

	Absent from work during the reference week due to:			
	Own health/ illness/injury	Childcare problems or other family/ personal obligation	“Other”	Any reason except those in columns (1)–(3)
	(1)	(2)	(3)	(4)
SNAP issuance occurred:				
14–21 days <i>before</i> the end of the reference week	0.001 (0.001)	–0.000 (0.001)	–0.002 (0.001)	–0.001 (0.002)
1–4 days <i>into</i> The reference week	–0.001 (0.001)	0.000 (0.001)	0.001 (0.002)	0.003* (0.001)
5–7 days <i>into</i> The reference week	0.003* (0.002)	0.004*** (0.001)	0.006** (0.002)	–0.001 (0.001)
1–7 days <i>after</i> the end of the reference week	0.014*** (0.002)	0.008*** (0.001)	0.012*** (0.003)	–0.004 (0.002)
Year fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes
Observations	55,734	55,734	55,734	55,734
Mean dependent variable	0.012	0.004	0.012	0.021
R <sup>2</sup>	0.012	0.007	0.013	0.010

Notes: Reasons for absence in column (4) include: on temporary layoff; on indefinite layoff; slack work/business conditions/waiting for a new job to begin; vacation/personal days; maternity/paternity leave; labor dispute; weather affected job; school/training; civic/military duty; does not work in the business. The omitted category is receiving benefits within a week prior to the start reference week, (i.e. labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

middle of the month. Thus, these states provide outsized support for our results. In Table A.2, we show that our results shown in Table 7 are robust to excluding either South Dakota or Maine- assuaging concerns that only one state might be driving our findings. Similarly, most of our variation is coming from the months of November and December. In Table A.3 we reproduce Table 7 excluding either the month of November or December. Our results hold.

Finally, we address concerns about the representativeness of our sample. As shown in Table 2, SNAP eligible individuals in our estimation samples are significantly whiter than the SNAP population. They are also more educated. To explore if our findings would generalize to the nation at large, in Tables A.4 and A.5 we show our results split by race (white/non-white) and education (high school graduate or less/some college or more). We see declines in the likelihood of being at work, as well as a reduction in hours worked, in both the white and the non-white sample at the end of the SNAP cycle. These results suggest that we would also see reductions in labor supply at the end of the SNAP cycle in states with a more diverse population. When we split by education, for both education groups there is a significant reduction in labor supply for two of the three outcomes at the end of the SNAP cycle.<sup>23</sup>

### 6. Potential mechanisms

Next, we provide some insights into the potential mechanisms driving the transitory impact of the SNAP cycle on absence from work. As

<sup>23</sup> We also explored heterogeneity by age (above and below 35), gender, and family type (married, unmarried). For all subgroups we see reductions on the intensive margin when SNAP benefits are received shortly after the reference week, although some of the estimates are not statistically significant.

part of the monthly CPS, respondents who report having been absent from work during the reference week are asked about the reason behind their absence.<sup>24</sup> We use this information to explore how the SNAP cycle impacts labor supply.

We start by investigating whether SNAP eligible individuals experience an increase in the probability of being absent from work at the end of the cycle through a health channel. A number of studies documents that people find it difficult to access sufficient food and that when facing a trade-off between food and medication purchases, they are more likely to experience health problems (Gucciardi et al., 2014; Seligman et al., 2014; Basu et al., 2017). In the context of SNAP, there is a relationship between timing of benefits and ER usage (Cotti et al., 2020; Arteaga et al., 2018). This evidence suggests that SNAP recipients might experience health-related problems at the end of the SNAP cycle when their budgets are tighter. Moreover, SNAP beneficiaries might experience mental health-related problems at the end of the cycle given that increased food insecurity (Gregory and Todd, 2021; Gassman-Pines and Schenck-Fontaine, 2019) and financial difficulties are likely to induce stress. Thus, we create an outcome variable that is equal to one if the employed respondent was out of work during the reference week for reasons related to own illness/injury/medical problems and zero otherwise. Table 8, column 1, shows the relationship between the timing of the SNAP distribution and the likelihood of being absent from

<sup>24</sup> Respondents can choose from 14 mutually exclusive categories. The categories are on temporary layoff; on indefinite layoff; slack work/business conditions/waiting for a new job to begin; vacation/personal days; own illness/injury/medical problems; child care problems; other family/personal obligation; maternity/paternity leave; labor dispute; weather affected job; school/training; civic/military duty; does not work in the business; and other.

work during the reference week for health reasons. Receiving SNAP benefits at the end of the SNAP cycle (i.e. in the week after the reference week) causes a 1.4 percentage points increase in health-related work absenteeism. This is a sizable effect: the mean of the outcome variable is 1.2%, hence this corresponds to an increase of more than 100% in the probability that a worker reports being absent for health-related reasons. Additionally, receiving benefits in the second half of the reference week is associated with a 0.3 percentage points increase in health-related work absenteeism. These findings are consistent with the end of the SNAP cycle leading to a worsening of health.

Second, SNAP beneficiaries at the end of their cycle could face a trade-off between food consumption and covering child care costs. Similarly, the timing of SNAP may impact the health and well-being of family members besides that of the survey respondent. In turn that may result in adults missing work in order to take care of relatives or children at home. To investigate if this channel might be at play, we construct a binary variable is equal to one if the employed respondent was out of work for reasons related to child care problems or other family obligations and zero otherwise. Table 8, column 2, shows an 0.8 percentage points increase in the probability of being absent from work during the reference week due to childcare or family obligations problems. This is also a sizable effect: the mean of the outcome variable is 0.4%. There is also a small and statistically significant increase in this type of absence when SNAP benefits are received in the second half of the reference week.

Third, at the end of the SNAP cycle, beneficiaries may be facing other trade-offs that impact work absenteeism. For example, previous evidence shows that transfer payment receipt is associated with increased drug or alcohol use, which in turn impacts the ability to work (Dobkin and Puller, 2007). Thus, if SNAP benefit receipt were to be associated with increased drug or alcohol use, then we might observe a reduced ability to work immediately following benefit receipt. In addition, due to reduced finances, individuals may face a trade-off between food consumption and covering transportation costs. If unable to cover transportation costs, the individual may have to be temporarily absent from work. Alternatively, individuals may need to visit food pantries at the end of the cycle limiting their availability to work. Given that the CPS survey is not granular in terms of the absence reasons in the *other* category, there exists the possibility that the category includes absences due to reasons such as above, which are possibly affected by the SNAP cycle. Column 3 considers being out of work due for reasons in the *other* category. Estimates suggest that there might be other channels through which SNAP timing temporarily impacts work absenteeism. Compared to individuals who received their benefits in the week before the start of the reference week, individuals who receive benefits 5–7 days into the reference week are 0.6 percentage points more likely to be absent from work during that week, while individuals who receive benefits in the week after the reference week, i.e. are at the end of the SNAP cycle for the entire duration of the reference week, are 1.2 percentage points more likely to be absent from work.

Finally, we run a placebo test: we construct an indicator variable equal to one if the employed respondent is out of work during the reference week for reasons that should not be affected by the SNAP cycle. These include: on temporary layoff; on indefinite layoff; slack work/business conditions/waiting for a new job to begin; vacation/personal days; maternity/paternity leave; labor dispute; weather affected job; school/training; civic/military duty; and does not work in the business. As column 4 shows, the timing of SNAP benefits does not impact the likelihood that a worker is absent from work for reasons such as business conditions, or short-term leaves. We previously found increased work absence at the end of the cycle for reasons like health, that should be affected by the SNAP cycle. The null estimates in column 4 suggest that this positive relationship is unlikely to be an artifact of other factors that happened to be correlated with the timing of SNAP benefits. Overall, these findings suggest that being at the end of the SNAP cycle and possibly having had exhausted the benefits leads to an increase in the likelihood of being absent from work only for health reasons, family/personal obligations, child care problems, or other.

## 7. Conclusion

We investigate whether the timing of transfer payments impacts the short-term labor supply of SNAP eligible individuals. Exogenous variation in the timing in which CPS respondents are surveyed enables us to estimate weekly labor supply of SNAP eligible individuals who are at various points in the SNAP benefit cycle. We find that timing of SNAP benefits impact labor supply at the intensive margin, while the extensive margin is unaffected. Specifically, individuals at the end of their SNAP benefits cycle are less likely to substitute into full time work from part time work compared to individuals at the start of their benefit cycle. They are also more likely to be absent from work for the entirety of the reference week. Finally, in some samples we see a reduction in reported hours worked. Results are more pronounced for individuals with high predicted benefit amounts. Our findings shed light on an unexplored consequence of SNAP timing and have implications for policy regarding features of the program such as the optimal frequency of benefit distribution.

If SNAP benefits are perceived as temporary positive income shock, theory would predicted higher labor supply at the end of the cycle compared to its beginning. However, the established evidence on the negative impacts of the end of the SNAP cycle on mental and physical health, can help us understand the adverse effects we find on labor supply. We provide evidence that workers are more likely to report absence from work due to own health concerns, childcare problems, or reasons related to beneficiaries' reduced financial liquidity at the end of the SNAP benefit cycle. These findings align with the recent literature on SNAP benefit cycles- especially the work on SNAP cycles and health. Our results are also consistent with the literature showing that scarcity or the uncertainty associated with income fluctuations may impair cognition and decision-making (Mani et al., 2013; Carvalho et al., 2016; Lichand and Mani, 2020).

While the results of the paper have strong internal validity, a limitation of the study is that it provides evidence based on data from the eligible population residing in the set of US states which distribute benefits on a single day each month. While our results extend to states with a short disbursement window, we cannot be certain they would hold in the remaining states. Finally, our findings suggest that month to month and cross-state estimates of work absence based on the CPS data may be slightly biased if they do not account for the timing of SNAP benefits.<sup>25</sup> In particular, estimates of work absences may be artificially high in settings when the reference week happens to fall late in the SNAP benefit cycle.

### CRedit authorship contribution statement

**Mindy Marks:** Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Silvia Prina:** Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Redina Tahaj:** Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

### Appendix

See Tables A.1–A.5.

### Data availability

Data will be made available on request.

<sup>25</sup> Gregory and Smith (2019) have shown that the year-on-year variation in December's reference week start and end dates coupled with the fact that the majority of SNAP benefits are issued at the start of the calendar month has the potential to bias official food insecurity statistics based on data from the food security supplement to the CPS which is fielded each December.

**Table A.1**  
Effects of SNAP timing on labor supply controlling for weekend receipt.

	At work (1)	Temporarily full time (2)	Hours worked (3)
SNAP issuance occurred:			
14–21 days before The end of the reference week	0.002 (0.003)	0.001 (0.001)	–0.052 (0.225)
1–4 days into The reference week	–0.004 (0.003)	0.003* (0.001)	0.134 (0.256)
5–7 days into The reference week	–0.011** (0.004)	0.001 (0.001)	0.531** (0.184)
1–7 days after The end of the reference week	–0.025*** (0.005)	–0.015*** (0.002)	–0.306 (0.329)
Weekend receipt	0.001 (0.002)	0.001 (0.001)	0.290** (0.102)
Year fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes
Observations	55,734	55,734	55,734
Mean dependent variable	0.953	0.013	32.241
R <sup>2</sup>	0.015	0.006	0.106

Notes: Weekend receipt is a dummy variable equal to one if SNAP disbursement occurred during the weekend in month *m* of year *y*. The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days before the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days into the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days into the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days after the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table A.2**  
Effects of SNAP timing on labor supply at the intensive margin excluding states.

	At work			Temporarily full time			Hours worked		
	All (1)	No SD (2)	No ME (3)	All (4)	No SD (5)	No ME (6)	All (7)	No SD (8)	No ME (9)
SNAP issuance occurred:									
14–21 days before The end of the reference week	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	–0.037 (0.122)	–0.030 (0.123)	–0.034 (0.123)
1–4 days into The reference week	–0.004* (0.002)	–0.003 (0.004)	–0.002 (0.003)	0.002** (0.001)	0.002 (0.001)	0.002* (0.001)	0.088 (0.168)	0.217 (0.282)	0.197 (0.279)
5–7 days into The reference week	–0.009** (0.003)	–0.004 (0.004)	–0.009** (0.004)	–0.001 (0.001)	–0.002* (0.001)	–0.000 (0.001)	0.061 (0.322)	–0.327 (0.198)	0.485** (0.181)
1–7 days after The end of the reference week	–0.023*** (0.005)	–0.014** (0.005)	–0.026*** (0.005)	–0.009* (0.005)	–0.003** (0.001)	–0.016*** (0.001)	–0.636** (0.231)	–0.377 (0.448)	–0.539 (0.366)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	112,409	100,982	102,546	112,409	100,982	102,546	112,409	100,982	102,546
Mean dependent variable	0.953	0.952	0.952	0.013	0.013	0.012	32.162	31.971	32.302
R <sup>2</sup>	0.012	0.013	0.013	0.006	0.006	0.005	0.102	0.100	0.102

Notes: Columns 2, 5, and 8 drop South Dakota from the sample, while columns 3, 6, and 9 exclude Maine. The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days before the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days into the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days into the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days after the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table A.3**  
Effects of SNAP timing on labor supply at the intensive margin excluding months.

	At work			Temporarily full time			Hours worked		
	All (1)	No Nov (2)	No Dec (3)	All (4)	No Nov (5)	No Dec (6)	All (7)	No Nov (8)	No Dec (9)
SNAP issuance occurred:									
14–21 days <i>before</i> The end of the reference week	0.000 (0.002)	–0.000 (0.002)	0.000 (0.002)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	–0.037 (0.122)	–0.068 (0.115)	–0.057 (0.117)
1–4 days <i>into</i> The reference week	–0.004* (0.002)	–0.004 (0.002)	–0.007*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002*** (0.001)	0.088 (0.168)	0.136 (0.189)	0.026 (0.109)
5–7 days <i>into</i> The reference week	–0.009** (0.003)	–0.008** (0.003)	–0.012*** (0.002)	–0.001 (0.001)	–0.001 (0.001)	–0.001 (0.001)	0.061 (0.322)	0.087 (0.336)	–0.027
1–7 days <i>after</i> The end of the reference week	–0.023*** (0.005)	–0.024*** (0.006)	–	–0.009* (0.005)	–0.010* (0.005)	–	–0.636** (0.231)	–0.546* (0.265)	–
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	112,409	102,260	102,751	112,409	102,260	102,751	112,409	102,260	102,751
Mean dependent variable	0.953	0.953	0.953	0.013	0.013	0.013	32.162	32.200	32.180
R <sup>2</sup>	0.012	0.013	0.013	0.006	0.006	0.006	0.102	0.102	0.103

Notes: Columns 2, 5, and 8 drop November from the sample, while columns 3, 6 and 9 exclude December. The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table A.4**  
Effects of SNAP timing on labor supply at the intensive margin by race.

	At work		Temporarily full time		Hours worked	
	Non-white (1)	White (2)	Non-white (3)	White (4)	Non-white (5)	White (6)
SNAP issuance occurred:						
14–21 days <i>before</i> The end of the reference week	0.002 (0.003)	–0.000 (0.002)	0.001 (0.002)	0.000 (0.001)	–0.040 (0.214)	–0.023 (0.148)
1–4 days <i>into</i> The reference week	0.020*** (0.005)	–0.008*** (0.002)	–0.005 (0.014)	0.003* (0.002)	0.245 (0.541)	0.083 (0.178)
5–7 days <i>into</i> The reference week	0.007 (0.004)	–0.011** (0.004)	–0.007 (0.007)	0.001 (0.000)	0.395 (0.742)	–0.008 (0.255)
1–7 days <i>after</i> The end of the reference week	–0.036*** (0.008)	–0.023*** (0.004)	–0.005 (0.014)	–0.009 (0.008)	–3.173** (1.347)	–0.414* (0.226)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,363	91,046	21,363	91,046	21,363	91,046
Mean dependent variable	0.953	0.953	0.012	0.013	31.338	32.355
R <sup>2</sup>	0.037	0.014	0.027	0.006	0.105	0.109

Notes: The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days *before* the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days *into* the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days *into* the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days *after* the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table A.5**  
Effects of SNAP timing on labor supply at the intensive margin by education.

	At work		Temporarily full time		Hours worked	
	High school or less (1)	Some college or more (2)	High school or less (3)	Some college or more (4)	High school or less (5)	Some college or more (6)
SNAP issuance occurred:						
14–21 days before	0.002	–0.002	0.000	0.000	0.031	–0.114
The end of the reference week	(0.002)	(0.002)	(0.001)	(0.001)	(0.117)	(0.196)
1–4 days into	–0.002	–0.008**	0.003	0.001	0.009	0.156
The reference week	(0.002)	(0.003)	(0.002)	(0.001)	(0.298)	(0.195)
5–7 days into	0.000	–0.022***	0.003**	–0.005***	–0.183	0.334
The reference week	(0.005)	(0.005)	(0.001)	(0.002)	(0.335)	(0.432)
1–7 days after	–0.011**	–0.041***	–0.010	–0.009***	–1.212***	–0.067
the end of the reference week	(0.004)	(0.005)	(0.011)	(0.003)	(0.376)	(0.210)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State-month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	61,193	51,216	61,193	51,216	61,193	51,216
Mean dependent variable	0.951	0.955	0.013	0.012	31.719	32.692
R <sup>2</sup>	0.016	0.020	0.010	0.011	0.124	0.093

Notes: The omitted category is receiving benefits within a week prior to the start reference week, (i.e labor supply at the beginning of the SNAP benefit cycle). 14–21 days before the end of the reference week is an indicator for benefit distribution two weeks prior to the start of the reference week (i.e. labor supply in the middle of the SNAP benefit cycle), 1–4 days into the reference week is an indicator for benefit distribution during the first four days of the reference week. 5–7 days into the reference week is an indicator for benefit distribution during the last three days of the reference week, and 1–7 days after the end of the reference week is an indicator for benefit distribution in the week following the reference week (i.e. labor supply at the end of the SNAP benefit cycle). All columns include the following variables as controls: age, age squared, 16 education dummies, 16 family size dummies, 16 family income dummies, four race indicators, an indicator for gender, six marital status dummies, an indicator for Hispanic origin, indicators for presence of children, presence of children under the age of five, weekly state influenza rates, weekly regional snowfall index, and the state monthly unemployment rate. Standard errors are clustered at the state level. Significance levels: \*  $p < 0.10$  \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

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