In this paper, we study the effects of the timing of nutritional aid disbursement on crime, using two main sources of variation: (a) a policy change in Illinois that substantially increased the number of SNAP distribution days and (b) an existing Indiana policy that issues SNAP benefits by last name. We find that staggering SNAP benefits leads to large reductions in crime and theft at grocery stores by 17.5% and 20.9%, respectively. Findings also show that theft decreases in the second and third weeks following receipt but increases in the last week of the benefit cycle due to resource constraints.

I. Introduction

While it is well documented that income shocks due to monthly government cash transfers increase street crime and illicit drug and alcohol use, much less is known about how in-kind transfer programs affect criminal behavior (Dobkin & Puller, 2007; Evans & Moore, 2011; Foley, 2011; Wright et al., 2014). One such program, the Supplemental Nutrition Assistance Program (SNAP), provides food purchasing assistance for nearly 45 million low-income Americans each year. Recipients are issued debit-like cards to which funds are electronically loaded once each month to be redeemed for foods at supermarkets or other authorized retailers. In most states, benefits are made available to a particular recipient on the same day each month, although different groups of recipients have different issuance days (a practice called “staggering”).

The objective of this paper is to estimate the effects of SNAP receipt on crime, focusing on policies that change the timing of benefit distribution. First, we examine the effects of staggered SNAP benefit issuance using Chicago reported crime data before and after a policy change that increased the number of distribution days. Second, we use individual-level conviction records from Indiana, where staggered benefit distribution days are determined by the first letter of the recipient’s last name, to measure how criminal behavior responds to the monthly disbursement of aid. Third, we analyze the effects of a policy change in Indiana that shifted benefit issuance later in the month but did not increase the number of distribution days.

Two main economic arguments support the notion that monthly SNAP payments affect crime. The first is based on the idea that large lump-sum payments to beneficiaries constitute income shocks, which can increase consumption of complements to crime, such as leisure or illicit drugs and alcohol. Previous work has found that cash transfers, such as Supplemental Security Income, can lead to increases in drug abuse, and, similarly, in-kind transfers, such as SNAP and Section 8 housing vouchers can affect alcohol purchases, drunk driving, and violent crime (Dobkin & Puller, 2007; Castellari et al., 2017; Cotti, Gordanier, & Ozturk, 2015; Carr & Koppa, 2017). These studies suggest that recipients view in-kind benefits as fungible, and receiving benefits may be akin to increasing overall household resources. Accordingly, distributing SNAP benefits later in the month has the potential to shift crimes away from the first of the month to later dates. Given that a primary justification for implementing in-kind transfers is to target aid and reduce perceived fungibility, determining whether in-kind transfers avoid some of the adverse consequences of cash transfers is of utmost importance.

The second argument posits that unless recipients are fully smoothing their consumption of benefits, they may face the need to reduce food intake at the end of the month due to financial stress and may engage in criminal behavior to obtain resources or food in response. While standard economic models of behavior imply that SNAP recipients ration benefits throughout the month to avoid shortages at the end of the benefits cycle, many studies have shown that recipients often run out of food in just two to three weeks, which suggests an inability to smooth their consumption effectively (Wilde & Ranney, 2000; Shapiro, 2005; Castner & Henke, 2011; Hamrick & Andrews, 2016; Bruich, 2014; Hastings & Washington, 2010; Goldin, Hononoff, & Meckel, 2016). Moreover, in many states, there is an extended period of time within each month where no recipients receive disbursements, limiting the amount of resources in low-income communities. These lean times may lead to greater levels of criminal involvement (for both recipients and nonrecipients alike) related to procuring resources. Therefore, providing beneficiaries with aid later in the month offers the potential to reduce the amount of crime committed due to resource constraints. These policies have other potential neighborhood-based advantages in that they may reduce incentives for individuals to commit crimes together or assist communities in consumption smoothing.
across households, as friends and neighbors likely receive benefits on different days.

To study the causal effect of SNAP benefit issuance timing on crime, we exploit a policy change in Illinois that drastically changed the monthly SNAP distribution cycle. In February 2010, Illinois switched from issuing most benefits on the first of the month to more substantial distribution later in the month. We focus on this change for three reasons. First, the policy change is considerable, affecting nearly 1.12 million individuals. Second, the city of Chicago maintains relatively high crime rates, which gives us a unique opportunity to speak to how low-cost policies can affect cities in which deterring criminal behavior may be of main concern. Third, because Chicago is both large and heterogeneous in terms of socioeconomic status, it provides an ideal forum in which to study differential effects for high-poverty areas.

Using day-level administrative data from Illinois, we find that SNAP redemptions closely track state issuance dates. Increasing the number of SNAP distribution days leads to a sharp decrease in the number of redemptions on the first of the month; after the policy change, the percent of total Illinois SNAP redemptions on the first and second of the month drops from 6% and 12% to about 3% and 6%, respectively. The observable change in use patterns due to the policy change suggests some scope for such a policy to affect timing and levels of criminal behavior. To study the extent to which increasing the number of SNAP benefit dates affects crime, we use administrative crime-level data for Chicago from 2007 to 2013 to analyze effects on overall crime and theft and also analyze when and where these crimes occur. We find, in particular, that crimes and thefts at grocery stores decrease by 17.5% and 20.9%, respectively, as a result of benefit staggering. Moreover, we study differential effects of the policy change across Census tracts and find larger effects in high SNAP enrollment areas and areas with higher concentrations of SNAP retailers.

Furthermore, to study the effect of SNAP receipt on criminal behavior, we use detailed individual-level conviction data from Indiana to disentangle benefits timing and monthly cyclicity of crime. SNAP issuance in Indiana has the distinct feature that benefit days are based on first letter of the recipient’s last name. This attribute allows us to measure intent-to-treat estimates for crimes committed in the weeks of the “benefit month” following disbursement. We find that crime falls by 4.3% in the third week after SNAP issuance but increases in the last week of the benefit cycle, when resources are likely to be most scarce. These effects are largely driven by end-of-the-month increases in theft by women. Finally, we find that shifting SNAP benefits later in the month (without increasing the number of SNAP issuance days) leads to a decrease in theft by 23.3%, on average.

This paper is the first to shed light on how SNAP receipt affects criminal behavior and incentives by analyzing how crime levels are affected by changing payment schedules and how types of crime differentially respond to nutritional assistance timing. In doing so, we make three main contributions to the existing literature. First, we measure the magnitude of the monthly cyclicity in crime and theft in Chicago and determine how much this cycle varies according to SNAP distribution. Second, we fill an existing gap in the literature by estimating the effects of changes to SNAP distribution on crime. As a result, we address how in-kind income shocks and consumption smoothing affect criminal involvement and build on Foley (2011) by examining the effects of SNAP distribution schedules on the timing, type, and locations of crimes committed. Our third contribution to the literature is the use of conviction-level data to speak to how much staggered SNAP issuance can affect criminal behavior right before benefit receipt. By exploiting the fact that SNAP benefits in Indiana are distributed each month based on the first letter of the last name, we disentangle calendar month cyclicity from benefit effects and are able to separate our findings by age groups, gender, race, and ethnicity.

Our analysis proceeds as follows. We first present background information on SNAP issuance policies in Illinois and Indiana. Next, we describe our data and empirical approach. Then, using data containing detailed crime-level reports, we estimate effects of a SNAP distribution policy change on overall crime and theft, as well as crime and thefts at grocery stores and estimate how monthly SNAP issuance affects the timing of criminal behavior. Finally, we provide a discussion on potential mechanisms that may be driving these results and consider the overall policy implications of staggered SNAP distribution.

II. Background on SNAP Issuance Policies

Despite the fact that SNAP is an entitlement program administered and funded by the U.S. Department of Agriculture, benefits are issued by states, and states have the authority to tailor rules for eligibility and implementation. This authority extends to the organization and timing of benefits, and as a result, there is significant variation in state SNAP disbursement schedules. Seven states currently distribute all benefits on one day of the month. However, a majority of states stagger issuance throughout the month, with different households receiving monthly benefits on different days of the month. For example, in a state that staggered, some recipients may receive

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2This number is calculated based on the fact that nearly 70% of the 1.6 million SNAP recipients in Illinois were directly affected by this policy (Indiana General Assembly, 2013; Food and Nutrition Services, 2011).

3In related work, Yang (2017) recently showed that SNAP and welfare eligibility reduce one-year recidivism rates for drug offenders, and, in a recent working paper, Barr and Smith (2018) find that the availability of the Food Stamp Program in the 1960s and 1970s in early childhood led to fewer violent crimes in adulthood as a result of the increase in household purchasing power.

4States that distribute benefits on the first of the month are Alaska, Nevada, North Dakota, Rhode Island, and Vermont. New Hampshire distributes all benefits on the fifth of each month and South Dakota does so on the tenth.
benefits on the third of the month, while others may receive their SNAP benefits on the tenth.

States may choose to stagger benefits for several reasons. First, staggering could reduce administrative or overhead costs for state agencies. By issuing benefits on multiple days each month, government employees do not have to handle as many cases at the beginning of the month, which could lead to fewer errors and better fraud detection. Second, spreading disbursement dates throughout the month could benefit consumers by reducing crowding at grocery stores and ensuring that retailers do not impose large price hikes at the beginning of the month, which could reduce the quantity or quality of food a family could buy with benefits. Third, by smoothing shopping spikes throughout the month, staggered disbursement policies may enable retailers to stock healthier and more perishable food items more consistently and manage staffing more effectively.

In this analysis, we focus on Illinois and Indiana to study how SNAP receipt timing affects crime. Prior to 2010, the Illinois Department of Health and Human Services distributed 66% of SNAP benefits on the first day of the month. As a result, areas with a high concentration of SNAP recipients experienced crowded grocery stores on the first, which made it difficult for store owners to properly stock perishable goods and staff stores accordingly (Indiana General Assembly, 2013). On February 16, 2010, Illinois changed its issuance policy, adding many cases to the fourth, seventh, and tenth day of each month. This change came about as a way to lessen the burden on grocery stores and other food sellers, as well as improve the shopping experience for SNAP clients (Indiana Family and Social Services Administration, 2013). Since Indiana issues benefits based on the first letter of the recipient’s last name (Indiana Family and Social Services Administration, 2013), states may choose to stagger benefits for several reasons.

Similarly, Indiana altered its SNAP benefits issuance schedule on February 1, 2014. We study the effects of this policy change and, in doing so, also exploit a remarkable feature of Indiana’s issuance policy. Since Indiana issues benefits based on the first letter of the recipient’s last name, we use this variation to avoid bias due to other factors that may be correlated with both SNAP receipt and criminal activity.

In particular, we are able to use conviction-level data to analyze how monthly income shocks affect criminal behavior. Table A1 provides the Indiana schedule of SNAP issuance days throughout the month based on the first letter of the last name for both before and after the policy change in 2014. Prior to 2014, Indiana issued benefits on days spanning the 1st to the 10th of the month; after 2014, they issued benefits every other day from the 5th to the 23rd. This policy shift varies from the change in Illinois, which increased the number of primary SNAP distribution dates. Indiana did not change the number of SNAP issuance days; rather, it spread out benefits and made them available later in the month. Approximately the same number of recipients received benefits on each disbursement day before and after the change. We use this policy change and the last name–based benefit issuance scheme to isolate as-good-as-random variation in the timing of receipt in our empirical models.

III. Data

We use crime data from two administrative data sets. The main advantage of these data sets is that both crime-level panels span several years and contain detailed information for a large number of crimes, including the type of crime committed. To more thoroughly study consumer response to SNAP policies, we supplement these data with information on daily SNAP redemptions and SNAP-authorized store locations. Below we provide a detailed description of the data used in our analysis.

A. Chicago Crime Data

For our main analysis, we use Chicago crime-level data from the City of Chicago’s online data portal for 2007 to 2013. For each crime, the data set contains information on the type of offense, the date and time the crime occurred, the location type (e.g., “grocery” or “apartment”), the block-level address, geographic coordinates, and indicators for whether an arrest was made. We then group crimes into categories by their listed types or locations (or both). The detailed descriptions of crimes in these data are a critical feature that we exploit to specifically analyze theft at grocery stores. Using geographic coordinates, we match crimes to their respective Census tract locations to create a date-by-Census-tract panel of counts of each crime type. This allows us to use Census tract fixed effects to control for neighborhood characteristics that may influence criminal behavior and consider heterogeneity across various types of communities.

To count the number of retailers in each Census tract in 2010 (the year the policy changed), we geocode addresses from the USDA Food and Nutrition Services list of SNAP-authorized retailers. We also integrate a measure of SNAP enrollment from the American Community Survey (2010 five-year estimates). Both of these measures allow us to examine heterogeneity by neighborhoods and compare results

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5The Illinois Retail Merchants Association, when asked about another potential future policy change, expressed support for the 2010 decision, stating that “bottlenecking all SNAP beneficiaries to the first 10 days of the month would produce problems with staffing, food ordering, packed stores for 10 days, empty stores for 20, empty store shelves and a lack of access to fresh fruits and vegetables for low income residents” (Indiana General Assembly, 2013).
6SNAP benefits are made available on the 1st, 3rd, 4th, 7th, 8th, 10th, 11th, 14th, 17th, 19th, 21st, and 23rd of every month, based on a combination of the type of case and the case name (Indiana General Assembly, 2013).
7The Indiana Family and Social Services Administration states that the change came about as a way to lessen the burden on grocery stores and other food sellers, as well as improve the shopping experience for SNAP clients (Indiana Family and Social Services Administration, 2013).
8We henceforth refer to these separate groups as “letter groups.” Each group comprises surnames that begin with two to four letters that receive their benefits on the same day, with the exception of “S.”
across Census tracts with high and low SNAP enrollment rates and SNAP retailer concentration.

Table A2, panel A, contains summary statistics for these crime data. On average, a Census tract in Chicago has 1.260 crimes per day, of which 0.262 are thefts. When we focus on crime and theft at grocery stores, the means drop to 0.014 and 0.009, respectively. Across the city of Chicago, this implies a daily city-wide mean of 11.452 and 7.362 crimes and thefts at grocery stores, respectively, which corresponds to approximately 4,180 crimes and 2,687 thefts at grocery stores each year.

B. Illinois SNAP Redemptions Data

To track the consumer response to the changes in SNAP distribution in Illinois, we use SNAP redemptions data from the Illinois Department of Human Services. These data contain information on the daily SNAP redemptions (total dollar amount of benefits redeemed) from January 1, 2008, to December 31, 2014. During this time period, Illinois beneficiaries redeemed $7,480,298 on average per day. We include these data to capture how beneficiaries alter purchasing behavior when SNAP disbursement schedules change.

C. Indiana Convictions Data

For the Indiana analysis, we use individual-level administrative conviction records from the Indiana Department of Correction that contain information on the first letter of the last name, date the crime was committed, date of birth, race, ethnicity, gender, county of conviction, and charged offense for all convictions from 2014 to 2016. Although the data span several years, we omit all crimes committed prior to 2012 to minimize the potential for selection bias for cases that take longer than two years to adjudicate. One important attribute of these data is that they contain offense dates matched to the offender’s first letter of last name, which allows us to study variations in crime by letter across days of the month.\(^\text{10}\)

One of the limitations of these data is that although they contain information on the convicted individual’s last name, we do not know which individuals received SNAP benefits prior to their conviction. Therefore, estimates on the effects of SNAP receipt on crime using these data will represent intent-to-treat effects and will understate the true effects of SNAP disbursement.

Table A2, panel B shows summary statistics for the Indiana convictions data. The average crimes committed per day in Indiana (resulting in conviction) for each last name letter is 0.844, with the largest share of crimes due to drug crimes (mean = 0.228). Thefts in Indiana average 0.098 per day per last name letter, or 930 per year statewide.

\(^{10}\)With the exception of the date the offense was committed, these data are available online through the IDOC Offender Search Tool: http://www.in.gov/apps/indcorrection/ofs/ors.

IV. Methods

This section details our estimation techniques for measuring the effects of SNAP issuance schedules on criminal activity.

A. Within-State Policy Change

We exploit the sharp change in the Illinois SNAP distribution schedule on February 16, 2010, which increased the number of distribution days, to identify the effects of staggered SNAP distribution on crime. This strategy is motivated by the idea that characteristics related to outcomes of interest vary smoothly across this treatment threshold; therefore, any discontinuity in criminal outcomes can be reasonably attributed to the change in SNAP issuance.

The main model is an interrupted time series model, which is equivalent to a regression discontinuity (RD) model in that we will look for a break in the trend in crimes at the time of the policy change. To this end, we create figures plotting means and linear fits of the data on either side of the cutoff to illustrate the magnitude of the break, and we control for polynomials of the days from the cutoff like a running variable. We estimate the following Census tract-level model using OLS where \(y_{it}\) is the count of crimes (of various types) on date \(t\) in Census tract \(i\):

\[
y_{it} = \beta_0 + \beta_1 \times SNAP \text{ staggered}_i + f(\text{days from cutoff}_i) + \pi_{it} + \gamma_{it} + \psi_{it} + \lambda_{it} + u_{it},
\]

where \(\beta_1\) is the coefficient of interest (the effect of staggered SNAP distribution), \(SNAP \text{ staggered}_i\) is an indicator variable equal to 1 for days after the policy change, \(\pi_{it}\) is day-of-week fixed effects, \(\gamma_{it}\) is day-of-month fixed effects, \(\psi_{it}\) is year fixed effects, and \(\lambda_{it}\) is Census tract fixed effects. To account for the substantial variation in weather in Chicago and its effect on crime, we also control for daily weather patterns (temperature, precipitation, and wind). We control for the days from cutoff (running variable) in multiple ways and allow it to vary on either side of the cutoff. Standard errors are clustered on the Census tract level. Because the distribution schedule changed again in July 2013, we do not use any observations after June 2013, and for symmetry, we do not use any data from before January 2007. While our preferred specifications limit the sample to observations that fall within the MSE-optimal bandwidths, as Calonico et al. (2016) suggested, our results are not sensitive to this choice. Results from a range of bandwidths yield similar results and are discussed in section V.

Our identifying assumption is that characteristics related to crime vary smoothly across the time of treatment: February 2010. Specifically, since the policy change occurred in the middle of the month, the interruption to benefit issuance scheduling likely also affected individuals during the first fifteen days of the month. Therefore, we consider the full
month to be treated in the following analyses and normalize our running variable to be equal to 0 on February 1, 2010.\textsuperscript{11} The fact that SNAP recipients cannot manipulate disbursement timing alleviates potential selection concerns. That said, with any discontinuity-based identification, it is important to consider whether there may be additional policy changes or general disruptions related to outcomes of interest that coincide with the policy change of interest. During 2010, no other major policy changes in Illinois corresponded to the change in SNAP distribution to the best of our knowledge. Finally, we note that we present figures showing large discontinuities in criminal behavior across the treatment threshold and perform a number of robustness checks to provide additional support for the identification assumption.

We estimate the effects of the Illinois policy change on the types of crimes, days of the month, and geographies that are most likely to respond to the change. Because half of all families receiving SNAP exhaust their SNAP benefits in two weeks (Castner & Henke, 2011), recipients may face a scarcity of resources during the remainder of the month. In response to this scarcity, they may turn to crime to meet nutritional needs. Crimes aimed at obtaining resources broadly (and food specifically) are more likely to respond to this mechanism, so we consider the effects on crime of any type: theft, crime at grocery stores, and theft at grocery stores.\textsuperscript{12} We also compare the effects on the post-policy change range of disbursement dates (the 2nd to the 23rd of each month) to the old primary disbursement date (the 1st) and the remainder of the month during which there is never SNAP disbursement (the 24th to the 31st), and present visual evidence of the day-by-day distribution of monthly crime levels before and after the policy change. Geographically, we compare neighborhoods in Chicago with high and low SNAP enrollment and high and low concentrations of SNAP retailers (both relative to the median across the city in 2010).

Finally, we consider the extent to which baseline specification choices drive the results of this analysis. We begin by estimating nonlinear functions of the days from cutoff, then estimate a count model to confirm that our choice of OLS does not drive our results. We also show results from models using triangular kernel weighting and provide evidence that the main findings are consistent for a range of bandwidths.

\textbf{B. Variation by Last Name}

Our second estimation strategy compares the monthly criminal patterns of groups of individuals with different SNAP disbursement dates. To do so, we exploit a noteworthy feature of Indiana SNAP issuance policies—specifically, that distribution dates are based on the first letters of SNAP recipients’ last names—to identify how benefit receipt affects criminal behavior.

Indiana also changed its disbursement schedule during our period of study, moving all letter groups to different dates later in the month. This allows us to capitalize on variation within calendar days and within letter groups in our identification. We build a letter-by-date panel from 2012 to 2016 containing the counts of various types of crime, and for each date, we calculate the days since disbursement (\textit{days since} \(l\)) for each letter according to the disbursement schedule.\textsuperscript{13}

Given that crime levels fluctuate within calendar months and benefits may be exhausted in fewer than four weeks, it may be the case that SNAP distribution affects criminal behavior differently across weeks in the benefit month. We first estimate an equation of the following form,

\begin{equation}
\gamma_{lt} = \beta_0 + \beta_1 \times \text{week2}_{lt} + \beta_2 \times \text{week3}_{lt} + \beta_3 \times \text{week4}_{lt} + \gamma_l + \pi_t + u_{lt},
\end{equation}

where \(\gamma_{lt}\) is the number of crimes committed by individuals whose last names starts with letter \(l\) (of the alphabet) on day \(t\), \text{week2}_{lt}\) is an indicator variable equal to 1 if it has been at least 7 but fewer than 14 days since potential SNAP receipt for letter \(l\), based on the Indiana SNAP issuance schedule, \text{week3}_{lt}\) is an indicator variable equal to 1 if it has been at least 14 but fewer than 21 days since potential SNAP receipt, and \text{week4}_{lt}\) is an indicator variable equal to 1 if it has been at least 21 days since potential SNAP receipt. In addition, we include letter fixed effects, \(\gamma_l\), to account for systematic differences in criminal behavior across the first letter of the last name and time fixed effects, \(\pi_t\), which include month, year, day-of-month, and day-of-week fixed effects to control for crime variation across months and years. We cluster our estimates on the surname first letter.\textsuperscript{14}

We estimate effects relative to the first week of benefit distribution for two reasons. First, if SNAP benefits induce an income shock that is consistent with inciting criminal behavior, we will be able to measure how much crime decreases in the weeks following that initial shock. Second, if recipients do run out of benefits within two or three weeks, it is important to estimate the effects of crime at the end of the benefit month when resources are most scarce.

Alternatively, we can model crime as a function of the distance from the disbursement date. To estimate the extent

\begin{itemize}
\item\textsuperscript{13}The policy change means that for a given day of the calendar month, each letter group has two different values for \textit{days since}.
\item\textsuperscript{14}We acknowledge that the last name letter may have systematic differences across race or ethnicity. We note that when replicating table 3, additionally controlling for race, ethnicity, and gender, all estimates are statistically similar to the main results at the 99% level. These results suggest that it is unlikely that groups of individuals with the same last name letter change their criminal behavior in an identical and systematic manner over time, orthogonal to SNAP staggering policy changes. Therefore, we assert that the differences in issuance timing by last name represent as-good-as-random variation.
\end{itemize}
SNAP BENEFITS AND CRIME

Figure 1.—Effect of Illinois SNAP Disbursement Change on Crime (Optimal Bandwidth)

Each panel plots month-level means of residuals (after differencing out weather effects and Census Tract fixed effects) and linear fits (with 95% confidence intervals) of each of the crimes listed. To the left of the vertical line, SNAP benefits were given out primarily on the 1st of the month, and to the right, they were distributed over the 1st to the 23rd. Crime data are from the city of Chicago. Daily weather data for Chicago are from the Global Historical Climatology Network and are based on temperature, precipitation, and average wind speeds from the Chicago O’Hare International Airport weather station.

to which crime levels respond to SNAP receipt nonlinearly, we estimate the following flexible model,

\[ y_{it} = \beta_0 + \beta_2 \times \text{days since } t_i + \beta_3 \times \text{days since } t_i^2 + \gamma_i + \pi_t + u_{it}, \]

where \( \text{days since } t_i \) measures the number of days since an individual could have been issued SNAP benefits, based on surname, \( \gamma_i \) are letter fixed effects, and \( \pi_t \) are time fixed effects, including year, month, and day-of-month and day-of-week fixed effects. Analyses allow errors to be correlated within last name letter over time when constructing standard-error estimates.

For comparison, we also present estimates from a regression discontinuity model, similar to our Illinois analysis, exploiting the February 2014 policy change in Indiana using a day-level specification that corresponds to equation (1). In the Indiana policy change, the number of days of SNAP issuance and the density of recipients per day did not change, but the distribution days changed from the 1st to 10th of the month to the 5th to 23rd of the month, which allows us to measure how shifting, rather than staggering, SNAP benefits affects crime.

Finally, we note that since we do not have information on SNAP receipt, all estimates will measure intent-to-treat effects. Therefore, any estimates based on the above methods will understate the true effects of in-kind transfers on crime.

V. Results

A. Within-State Policy Change Results

Main results. First, to analyze the extent to which staggering SNAP benefits reduces crime, we present graphical evidence in figures 1 and A1 for the MSE-optimal bandwidth and full bandwidth, respectively. Each figure plots residualized monthly means of daily Census tract–level counts.\(^{15}\)

\(^{15}\)Monthly cyclicity in crime is particularly pronounced in Chicago given its cold winters. Appendix figure A2 replicates these figures for crime at
The months to the left of the vertical line are before the policy change, indicating that the distribution of benefits occurred primarily on the 1st of the month. The months to the right of the vertical line are after the policy change when SNAP benefit issuance was more spread out from the 1st to the 23rd. We also display linear fits and 95% confidence intervals for the Census-tract-by-day counts of the crimes (after removing weather effects and Census tract fixed effects).

Overall, we estimate large and statistically significant reductions in overall crime and theft (top rows). Moreover, both crime and theft occurring at grocery stores (bottom rows) exhibit large dropoffs after the policy change, and the effect on theft at grocery stores is particularly striking.

Table 1 presents estimates from the same comparisons shown in figures 1 and A1 based on the OLS model described in equation (1). The results include both average effects for the full bandwidth and MSE-optimal bandwidth (columns 1 and 2, respectively), as well as results by day-of-month ranges for all four crime outcomes (columns 3–5). We also report the preperiod means for each time span by crime type. Standard errors are clustered on the Census tract level, although results are robust to clustering on the days from the cutoff.

These empirical results in columns 1 and 2 largely reinforce the conclusions that can be drawn from the figures: staggering SNAP benefits leads to a decrease in overall crime by 3.9% to 13.1% and theft by 10.5% to 11.4%, driven by reductions in crime at grocery stores and theft at grocery stores by 17.5% and 20.9%, respectively. These effects correspond to approximately 835 fewer crimes at grocery stores and 687 fewer thefts at grocery stores per year in the city of Chicago and imply that issuing benefits later in the month can help families better smooth their consumption and avoid resource scarcity at the end of the month.

Timing results. Our results generally indicate that crimes go down after staggering SNAP benefit issuance dates. However, it is unclear what is driving this effect. To examine potential mechanisms, we consider the days and locations most likely to be most affected by the policy change. If recipients are resource constrained and commit crimes at the end of the month in response to an inability to smooth consumption, we might expect to see crime levels in the latter part of the month experience larger drops compared to days earlier in the month. But if recipients now receive fewer resources on the first, we may expect to see reductions in crime earlier in the month. In this section, we consider evidence on the differential effects of the Illinois policy change across the days of the month.

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**Table 1.** Effect of Staggering SNAP Benefits on Crime

<table>
<thead>
<tr>
<th>Crime</th>
<th>Average Effect</th>
<th>Average Effect</th>
<th>Day-of-Month Range</th>
<th>Preperiod Mean</th>
<th>Number</th>
<th>Number</th>
<th>Preperiod Mean</th>
<th>Number</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crime</td>
<td>Average Effect</td>
<td>Average Effect</td>
<td>Day-of-Month Range</td>
<td>Preperiod Mean</td>
<td>Number</td>
<td>Number</td>
<td>Preperiod Mean</td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>SNAP staggered</td>
<td>0.0793***</td>
<td>0.0028**</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
<td>0.1941</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
</tr>
<tr>
<td>Preperiod mean</td>
<td>0.0793***</td>
<td>0.0028**</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
<td>0.1941</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
</tr>
<tr>
<td>Number</td>
<td>0.0793***</td>
<td>0.0028**</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
<td>0.1941</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
</tr>
<tr>
<td>Theft</td>
<td>0.0531***</td>
<td>0.0037**</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
<td>0.1941</td>
<td>0.0011</td>
<td>0.016</td>
<td>0.1411</td>
</tr>
<tr>
<td>Preperiod mean</td>
<td>0.0531***</td>
<td>0.0037**</td>
<td>0.0011</td>
<td>0.016</td>
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Estimates are based on crime data from the city of Chicago. Each coefficient is generated by a separate Census-tract-by-day regression of equation (1) using the listed crime type as the dependent variable and data from all days (columns 1 and 2) or the ranges listed at the top of each column. Daily weather data for Chicago are from the Global Historical Climatology Network and are based on temperature, precipitation, and average wind speeds from the Chicago O’Hare International Airport weather station. Each regression includes year, day-of-month, and day-of-week fixed effects. Standard errors are clustered on the Census tract level and reported in parentheses. We also report the mean of each outcome for the period before the policy change (January 1, 2007–February 15, 2010). Significance at 10%, 5%, and 1%.

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16 Clustering on the days from the cutoff would be the analog of clustering on the running variable in a regression discontinuity model. We note that our approach of clustering on Census tract leads to more conservative estimates. These results hold even when we do not account for time fixed effects. See figure A2 for a replication of figure A1 with nonresidualized means.

17 We also find similar results for theft at retail stores, residences, and street theft (reduction of 15.0%, 12.5%, 8.8%, respectively). However, we estimate statistically insignificant effects for ATM and bank thefts. These results imply that staggering SNAP policies are likely targeting resource scarcity more so than financial insecurity. Estimates on retail store thefts, street thefts, and thefts at residences, combined with our results on grocery store thefts, indicate that staggering SNAP benefits led to sixteen fewer thefts per day citywide, accounting for up to 70% of total crime reduction and 85% of the reduction in thefts.
Prior to the policy change, nearly all SNAP benefits were given out on the 1st of the month, with over 60% redeemed on that date. After the change, the distribution timing was staggered, with 19% of benefits given out on the 2nd to 23rd and 20% on the 24th to 31st. This change in issuance timing is expected to affect consumer behavior. To estimate the effects of benefit staggering, we identify three distinct ranges of days within each month in which we may expect to see differential effects of the Illinois policy change: the 1st of the month, the 2nd to 23rd, and the 24th to the end. Prior to the policy change, over 60% of SNAP benefits were given out on the first of the month, but after the change, they were spread over the 1st to 23rd, implying a large reduction in the benefits given out on the 1st and an increase in those given out on days ranging from the 2nd to the 23rd. No SNAP recipient ever received benefits from the 24th to the end of the month.

Importantly, if consumers are able to fully smooth consumption throughout the month, we would not expect a change in issuance timing to affect behavior. To show how consumers respond to this change, we present SNAP redemptions data for Illinois in figure 2. Prior to the policy change, nearly 6% of SNAP benefit redemptions occurred on the first of the month and 12% on the second, with approximately 2% to 3% redeemed each day two to three weeks after receipt and less than 2% redeemed each day in the last week of the month. After Illinois began to stagger benefits, however, the percent of SNAP benefits redeemed on the first of the month fell to only 3% and remained more consistent throughout the month. Therefore, figure 2 indicates that consumers do alter shopping behavior when benefit distribution days change. It is reasonable to believe that recipients also change consumption behavior and other behaviors, like criminal involvement, when they experience an income shock later in the month.

Columns 3 to 5 in table 1 present estimates based on the OLS model in equation (1) restricting the sample to the day groups discussed above (1st of the month, 2nd to 23rd, 24th to 31st). Estimates in column 3 indicate that on the first of the month, theft, crime at grocery stores, and theft at grocery stores do not change as a result of staggered SNAP benefits. Estimates for overall crime levels are negative and statistically significant. This may be because staggered SNAP distribution influences other types of criminal behavior, such as alcohol or drug crimes, not captured in the grocery theft or grocery crime estimates, and therefore has the ability to diminish large first-of-the-month income shocks.¹⁹

Columns 4 and 5 of table 1 present findings for days 2 to 23 and days 24 to 31, respectively. All of the estimates in column 4 are negative and statistically significant, implying that the policy change caused a reduction in all reported types of crime. In particular, thefts in the city of Chicago decreased by 14.7%. However, we also estimate large changes in thefts and crimes at grocery stores. The magnitudes of these effects suggest that staggered SNAP distribution led to a 33.6% reduction in grocery store theft and approximately a 25.6% decrease for grocery store crimes in days 2 to 23. Taken together, these results suggest that staggering SNAP benefits has the potential to reduce crimes associated with resource constraints in the first three weeks of the month, when families begin to exhaust their benefits. However, estimates in column 5 are statistically insignificant. These findings indicate that staggering SNAP benefits does not change recipient behavior in the never-treated range (days 24–31), which implies that although staggered SNAP policies can lower overall crime levels, especially in days 2 to 23, recipients may still feel resource constrained at the very end of the calendar month, before receiving other income transfers.

To further explore the dynamics of the effects over the month, we plot the mean Census tract–level crimes (after differencing out year and month fixed effects) by day of month in figure 3.²⁰ The solid line is a polynomial fit of these means for the months after the policy change (when SNAP benefits were staggered from the 1st to 23rd). The dashed line corresponds to the time before the policy change, when SNAP was mostly disbursed on the 1st of the month. The area between the two vertical lines contains the range of days over which many more SNAP disbursements were given out after the policy change.

With the exception of a decrease on the first of the month, overall crime and thefts, shown in the top rows, do not appear

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¹⁹ Another potential explanation is that after the policy change, the first of the month becomes the end of the benefit month for many households. Therefore, it is possible that any first-of-the-month effects from other sources of income are mitigated by the availability of nutritional assistance. We explore this possibility in the following section.

²⁰ These plots can be compared to figure 2 in Foley (2011).

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Figure A3 additionally shows the month-level means and linear fits for SNAP redemptions analogous to figure A1. While SNAP redemptions increase over time, there is no distinct discontinuity in redemptions after February 2010, indicating that the policy change was not simultaneously paired with a large increase in total benefits.

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Authors’ calculation based on daily SNAP redemptions data from the Illinois Department of Health and Human Services. The solid line is calculated for January 2007 to January 2010. The dashed line, indicating the postperiod after the policy change, is calculated for February 2010 to May 2013.
to exhibit any systematic changes due to the policy. Conversely, both crime and theft at grocery stores are higher after the policy change from the 2nd to the 10th and then much lower for the remainder of the month (except for the very end). We also find large first-of-the-month effects, which appear to be somewhat mitigated by the change in disbursement.21

Geographic results. If SNAP distribution affects the available resources for SNAP recipients or communities where a large proportion of SNAP recipients live or shop, crime rates will be more responsive to the policy change in areas of high SNAP use. Moreover, if individuals have a propensity to commit crimes in groups based on a shared influx (or lack) of resources, smoothing disbursement may help to reduce overall crime. We explore these possibilities by first considering geographic subgroups according to two metrics of SNAP use in Chicago: the proportion of residents enrolled in the SNAP program and the number of certified SNAP retailers. We define high (low) SNAP enrollment as having more (less) than the median percentage of SNAP enrollees in a Census tract and define high (low) SNAP retailer concentration as having more (fewer) than the median number of SNAP retailers in a Census tract.22

Table 2 contains results by these subgroups of Census tracts. Column 1 replicates the baseline estimates presented in table 1, column 1 for reference. Columns 2 and 3 contain the results for low and high SNAP enrollment rates, respectively, which are obtained by estimating equation (1) for the given subgroup. For both crime and theft in general, we

21 Due to the large spikes in crime on the first of the month, one concern is that the default reporting date of a crime is the first if the date is otherwise unknown. While this is unlikely, it would not cause concern for identification unless reporting systematically changed on the same date as the policy change. We find no evidence of first-of-the-month effects for crimes occurring at grocery stores.

22 According to the American Community Survey (ACS), the median percentage of SNAP enrollees by Census tracts in Chicago in 2010 is 13.6%. The median number of SNAP retailers is 2, and the number ranges from 0 to 18. See figure A4 for a map of SNAP retailers and grocery store crimes in Chicago Census tracts.
We have shown that staggering SNAP benefits has the potential to reduce crimes across the month; however, we cannot speak to when these crimes occur relative to a particular individual’s receipt date. To disentangle the effects of benefit issuance from monthly crime cycles, we first present trends in crimes committed over the benefit month and calendar month. Here, “benefit month” is defined as the month-long time span between disbursements for a given individual. That is, the “first” of the month corresponds to the first day on which SNAP benefits are available (i.e., disbursement date). We compare crimes committed to the number of days since a convicted individual would have received SNAP benefits, based on the first letter of his or her last name. For example, if John Smith committed a crime on the 27th in 2014, he would have potentially had SNAP benefits issued to him on the 19th, 8 days earlier. Although the crime would be recorded as 27 days into the calendar month, we additionally classify the crime as being committed 8 days into the benefit month.

Table 3 panel A presents estimates that measure how crime fluctuates in the weeks following SNAP distribution. Estimates are relative to the first week after SNAP receipt, as we may expect crime to be either highest (if SNAP benefits provide enough of an income shock to encourage criminal

estimate negative and statistically significant reductions across nearly all columns. Effects for crime and theft comparing high and low enrollment and retailers are statistically similar for each neighborhood group, suggesting that staggered SNAP policies have the potential to affect criminal activity citywide. However, only high-enrollment areas experience a statistically significant decline in crime and theft at grocery stores. Specifically, crime at grocery stores declines by approximately 24%, while theft at grocery stores declines by 32% in these Census tracts.

Differences between these areas could also reasonably be attributed to the lack of grocery stores. The last two columns in table 2 address this idea directly. If SNAP recipients are committing theft or other impulsive crimes at grocery stores, they are likely to do so in stores that accept SNAP. Therefore, we may expect the effects to be larger in Census tracts that have a large number of SNAP retailers. Indeed, estimates in column 5 provide support for such a story. Crime at grocery stores declines by 24.2% in Census tracts with a high concentration of SNAP retailers; we do not find any evidence of reductions in grocery store theft or crime in neighborhoods with few SNAP retailers. Similarly, staggering SNAP benefits reduces theft at grocery stores by 28.8% in Census tracts with a high concentration of SNAP retailers.

B. Variation by Last Name Results

Main results. We have shown that staggering SNAP benefits has the potential to reduce crimes across the month; however, we cannot speak to when these crimes occur relative to a particular individual’s receipt date. To disentangle the effects of benefit issuance from monthly crime cycles, we first present trends in crimes committed over the benefit month and calendar month. Here, “benefit month” is defined as the month-long time span between disbursements for a given individual. That is, the “first” of the month corresponds to the first day on which SNAP benefits are available (i.e., disbursement date). We compare crimes committed to the number of days since a convicted individual would have received SNAP benefits, based on the first letter of his or her last name. For example, if John Smith committed a crime on the 27th in 2014, he would have potentially had SNAP benefits issued to him on the 19th, 8 days earlier. Although the crime would be recorded as 27 days into the calendar month, we additionally classify the crime as being committed 8 days into the benefit month.

Table 3 panel A presents estimates that measure how crime fluctuates in the weeks following SNAP distribution. Estimates are relative to the first week after SNAP receipt, as we may expect crime to be either highest (if SNAP benefits provide enough of an income shock to encourage criminal

While we have considered using a subgroup of only food deserts, as defined by the USDA, estimates are imprecise and therefore less meaningful for this analysis.

For example, if John Smith committed a crime on the 27th in 2014, he would have potentially had SNAP benefits issued to him on the 19th, 8 days earlier. Although the crime would be recorded as 27 days into the calendar month, we additionally classify the crime as being committed 8 days into the benefit month.
behavior) or lowest (as resources are the least constrained in the first week of receipt) in this week. In the second week following potential SNAP receipt, there is no statistically significant effect on criminal behavior for any crime type relative to the first week. From 14 to 21 days after SNAP issuance, overall crime levels fall by about 4.1%, although estimates for all other crime types are statistically insignificant. In the fourth week of the benefit month, alcohol crimes increase by 11.7%. It is possible that financial stress near the end of the month increases incentives to drink heavily or, alternatively, that as food becomes scarcer, recipients have a lower threshold for intoxication.

Following Foley (2011), we show these results grouped by three days instead of weeks in figure A7 and table A3. When effects are grouped into more bins, estimates for overall crime levels and drug crimes are statistically insignificant for all day groups. However, we find that theft and alcohol crimes increase on days 27 to 31 of the benefit month, or four weeks after SNAP receipt.

These findings suggest that unlike other in-kind or cash transfers that are distributed at the beginning of the month, staggered SNAP benefits do not incentivize criminal behavior at the beginning of the benefit month relative to other times of the month. This could be due to the fact that SNAP benefits are relatively small in-kind transfers (about $127 per person per month) or, as a recent study has found, that individuals do not view SNAP benefits as fungible (Hastings & Shapiro, 2017).

Since figure A5 and results in panel A of table 3 indicate that SNAP distribution dates and criminal behavior are related nonlinearly, table 3, panel B shows effects of SNAP issuance on crime quadratically controlling for days since receiving SNAP. While crime levels decrease at the beginning of the benefit month, they exhibit a positive and increasing relationship at the end of the month, approximately after 28 days. Contrary to other studies on cash transfers, we find no effects of SNAP receipt on drug crimes. As in the week-by-week results in panel A, crime levels hit their lowest point when we expect beneficiaries to exhaust benefits, and average crime levels increase at the end of the benefit month when resources are most scarce. Findings from panels A and B suggest that recipients stay home and commit fewer crimes during the second and third weeks of the benefit month, relative to the first week, and increase criminal involvement right before receipt. One potential explanation is that beneficiaries experience an income shock in the first week, which lends them the ability to go out with friends or purchase complements of crime. However, during the second and third weeks, there are no available funds for leisure, and recipients stay home. By the end of the benefit month, recipients have run out of food or other resources and commit more crimes as a way to alleviate this scarcity. To elucidate the complex nature of this relationship, we explore subgroups of individuals in the next section.

### Subgroup analysis

It may be the case that individuals of various age, race, ethnicity, and gender are affected by SNAP policies differently, likely due to differential participation rates in the program. To explore the extent to which criminal behavior between these subgroups varies, we estimate effects of staggered SNAP benefit timing on convicted crimes and show these results in tables A5 (race, ethnicity, and gender subgroups) and (age subgroups).

About 3% of the sample of Indiana offenders is Hispanic, 28% is black, 68% is white, and 15% is female. In table A5, panel A shows the effects of staggering SNAP benefits on crimes committed by white persons; as expected, estimates are similar to the main results for Indiana and indicate a decrease of overall crime and theft in the third week after receipt. Panels B and C display effects for African Americans and Hispanics, respectively, and nearly all estimates are small and statistically insignificant. Panel D presents estimates for women. Importantly, estimates indicate that theft increases by 14.2% in the fourth week of the month after receiving SNAP benefits. This suggests that women are more likely to steal food or other resources after exhausting their benefits.

Given that women are especially affected by such policies, we expand on this analysis by examining the effects of SNAP disbursement changes on crimes by women for three-day groups in table 4 to get a better sense of how the timing of criminal behavior is affected during the fourth week of the benefit month. Findings indicate that theft increases by

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23Alcohol crimes include public intoxication and driving while intoxicated.

24For a graphical depiction of these results, see figure A6.
26.5% 24 to 26 days after receipt and 21.6% 27 to 31 days after SNAP receipt. Overall, these effects correspond to 551 more thefts (resulting in conviction) in the third and fourth weeks following benefit receipt by women in the state of Indiana over a four-year period. Combined with findings from table A6, which indicate that effects on theft are driven by individuals above the age of 40, our results imply a striking conclusion: at the end of the month, older women commit as many crimes as younger women; however, given the relatively low baseline, this is smaller than the MSE-optimal bandwidth for all outcomes except the overall crime level. We note that these effects are not statistically significant when we use the full sample. Given the small optimal bandwidth of 99 days, effects estimated for this 8-day range are based on a more spread-out distribution schedule, starting on the 5th and ending on the 23rd. To phase in this change, in January only, SNAP clients received half of their benefits on the 2013 date and half on their new date. By February 2014, the new schedule took full effect. (See table A1 for the SNAP issuance schedules.)

We use this within-state variation to analyze how shifting benefit issuance toward the middle of the month affects criminal behavior. To do so, we provide corresponding figures to show how crime levels responded to the change in policy just after February 1, 2014. Figures A8 and A9 present average monthly crime levels over time, controlling for daily weather patterns. We note that shifting the SNAP benefit schedule seems to have a less immediate impact than expanding the number of benefit days.

Table A7 contains the analogous point estimates (from estimating a statewide version of equation [1]), as well as separate estimates for the 1st to 5th of the month, which were treated prior to the policy change but not after, days 6 to 10, which were treated in both periods; days 11 to 23, which were treated only after the policy change; and days 24 to 31, which were never treated.

Indiana’s policy change. We also replicate the policy change analysis from section VA using data from Indiana. In January 2014, the state of Indiana altered the SNAP issuance dates from the first ten days of the month to June 30, 2015.

Estimating the MSE-optimal bandwidth for each crime type yields a one-sided bandwidth of 99, 166, 145, and 125 days for crime, theft, drug crimes, and alcohol crimes, respectively. Therefore, this reduced bandwidth is smaller than the MSE-optimal bandwidth for all outcomes except the overall crime level. However, we note that we drop a maximum of 46 day observations, indicating that without sentencing reform, estimates would likely be similar, albeit more precise.

28Specifically, the new law “provides that: (1) after June 30, 2014, and before July 1, 2015, a person convicted of a Level 6 felony may not be committed to the department of correction if the person’s earliest possible release date is less than 91 days from the date of sentencing, unless the commitment is due to the person violating a condition of probation, parole, or community corrections and the violation is not technical; and (2) after June 30, 2015, a person convicted of a Level 6 felony may not be committed to the department of correction if the person’s earliest possible release date is less than 366 days from the date of sentencing, unless the commitment is due to the person violating a condition of probation, parole, or community corrections by committing a new criminal offense” (General Assembly of the State of Indiana, 2015).
on few observations and are likely to be spurious. These findings reinforce the same conclusion as before: staggered SNAP policies can help families to smooth consumption better and lower crimes associated with resource scarcity.

C. Robustness Checks

Model specification. In this section, we present a set of sensitivity checks to provide additional support for our main identification assumptions. We first turn to the discontinuity-based specification. A standard concern in such models is that the results are a product of over- or underfitting the data or a product of bandwidth selection. To combat these concerns, we explore various alternative specifications in this section and show that our average estimates are robust to these other specifications.

First, we allow the function of the days from the date of the policy change (the running variable) to vary in order. Column 1 in table 5 replicates the baseline results for comparison. Columns 2 and 3 contain the results when we allow for our running variable to vary quadratically and cubically on either side of the cutoff, respectively. The quadratic models generally produce results close to the baseline models. Under a cubic fit, some of the estimate magnitudes are smaller, but all are still statistically significant and are similar to baseline estimates.

Second, we explore how sensitive the estimates are to kernel selection. In keeping with the current methodology in regression discontinuity models, we follow Calonico et al. (2016) to determine the mean square error optimal bandwidth for the RD estimator throughout the paper and estimate the model with a triangular kernel, instead of a uniform kernel, in column 5. All of the point estimates are stable when compared to the main results and statistically significant. We also use the triangular kernel to estimate the average effects on the full bandwidth in column 6, and we find consistent results. All coefficients are negative and statistically significant, although some vary slightly in magnitude.

To further test bandwidth sensitivity, we replicate the models under a range of bandwidths. We test bandwidths from 2 months on either side to the full bandwidth (39 months) specification in increments of one month at a time. Figure A10 reports the coefficients and standard errors from models using each of these alternative bandwidths. For all outcomes, the estimated coefficient on the policy change is negative and consistent across the different bandwidths.

We also conduct permutation inference using placebo estimates from preperiod crime data to provide evidence that the discontinuity observed in Chicago is a result of the SNAP policy change in the spirit of Abadie et al. (2010). To do so, we randomly select a date from 2007 to 2010 and assign it as a treatment cutoff date, without replacement. We then generate distributions of t-statistics based on these RD estimates, using the preferred specification in equation (1) and MSE-optimal bandwidths associated with table 1, to determine what percent of the simulated estimates from 1,000 random draws are less than the estimate reported in table 1. The distributions of placebo estimates for crime, theft, grocery store crimes, and grocery store thefts are shown in figure 5.

Although the newest version of the STATA rdrobust package allows the consideration of covariates in the bandwidth selection, we cannot use year and day-of-month fixed effects in this step. Because some of the fixed effects are 0 in smaller bandwidths, it is unable to select one when we include them. All other covariates are included in bandwidth selection.

33 Estimates from bandwidths ranging from 4 to 39 months are statistically significant at the 5% level.

34 When randomly selecting a treatment date, we drop observations that would be included within the optimal bandwidth according to our true treatment date.

35 Specifying it is unclear what crime types are driving this large increase in overall crime levels at the end of the month. While we estimate statistically insignificant increases in drug crimes at the end of the month (p-value = 0.2), we estimate that shifting SNAP dates later in the month leads to a 177.4% increase in arrests for drug dealing during days 24 to 31, as well as increases in sex offenses. However, we find no effects specifically for drug possession, rape, or sexual battery and do not estimate statistically significant effects for robbery, burglary, or weapon crimes. Therefore, such policies have the potential to shift some drug crimes and violent crimes toward the end of the month, although most crime types are unaffected.
A11. Based on these placebo distributions, 14.5% and 0% of t-statistics are less than the reported estimates for any crime and theft in absolute value, respectively, while 0.4% and 0.9% of placebo t-statistics are smaller in absolute value than the reported estimates for grocery store crimes and thefts, respectively, which provides additional support for the idea that the policy change is driving the reported results.

Finally, we provide additional support that the variation in Indiana SNAP issuance is comparable across groups. Table A8 displays the average crimes committed by each SNAP letter group and the available demographic characteristics. When estimating a joint comparison test, the numbers of convictions by letter group are statistically indistinguishable (F-statistic = 2.54). These statistics suggest that the letter groups are quite similar, although our use of the first letter of the last name fixed effects does not require this to be the case.36

Alternative explanations. Given that monthly fluctuations in Chicago crime are driven by weather patterns, we include controls for weather variables, which include average daily high and low temperatures, snowfall, wind speed, and precipitation, in all RD specifications.37 If weather patterns changed at the same time as the implementation of the new SNAP issuance schedule, we would be concerned that our estimates overstate the true impact of changes in household behavior on crime. As shown in figure A12, all of these weather variables are smooth across the treatment threshold. In figure A13, we also show that our results are not being driven by sharp changes in labor market conditions using data from the Bureau of Labor Statistics.

Another important consideration is that increasing the number of SNAP issuance dates raises the probability that every month, some proportion of total recipients receive benefits on the weekend. Therefore, if recipients consume different amounts or types of goods when they experience an income shock on the weekend, it may be the case that our estimates are simply accounting for weekday versus weekend consumption patterns. This may be problematic, if, for instance, recipients purchase more complements to crime (like alcohol or drugs) when receiving benefits on the weekend or if, on the contrary, individuals are more likely to stay home and out of trouble.38

To explore the extent to which individuals receiving SNAP benefits on the weekend commit crime, we replicate our main results in table A9 and control for an indicator variable equal to 1 for any benefit issuance dates that fall on a Friday or Saturday. Although weekend benefit receipt is associated with more crimes and thefts overall, crime and thefts at grocery stores seem unaffected by whether individuals receive benefits on the weekend. Estimates are statistically indistinguishable from those in table 1 and indicate that weekend benefit issuance does not play a major role in affecting a recipient’s ability to smooth consumption during the month.39

Finally, these estimates may overstate the extent to which staggering benefits reduces crime if it changes the likelihood of getting caught for a grocery store crime or theft. Specifically, if the policy change shifts crowds to other SNAP disbursement dates, more crimes may go undetected. Our estimates imply that reporting bias due to grocery store crowding is unlikely in this context, as we do not see a large increase in SNAP redemptions on the twelve issuance dates as a percent of total sales before and after the policy change.40 Although the reduction in shopping on the first of the month is substantial, the increase on other days small—around 1% more in spending each day.41 Finally, we note that since overall incidences of theft decrease after the policy change, our findings point to changes other than grocery store staffing and reporting.42

VI. Discussion

In this paper we document a stark effect of dispersing distribution of SNAP benefits over a larger span of days each month: a reduction in the number of overall crimes and thefts, with much larger effects for crimes and thefts that occur in grocery stores. To measure this effect, we examine the responses to a large policy change in the city of Chicago. Prior to this change, over two-thirds of SNAP benefits were given

36We note that race and ethnicity do vary by group; however, when including demographic controls in our main analysis, all estimates are statistically similar at the 99% level, which suggests that these factors are not driving our results.
37Daily weather data for Chicago are from the Global Historical Climatology Network and are based on temperature, precipitation, and average wind speeds from the Chicago O’Hare International Airport weather station. Estimates without these controls are similar to results in table 1 and indicate that staggering SNAP benefits reduced crime and theft at grocery stores and that these declines are driven by the effects from the 2nd–23rd.
38For support of each of these stories, see Castellari et al. (2017) for evidence of the former and Cotti et al. (2015) for evidence of the latter.40

39We also provide similar results, controlling for weekend paydays (i.e., an indicator variable equal to 1 if the 1st or 15th of the month falls on a Friday or Saturday) in table A10 to explore how other potential income shocks could affect crime. We use these dates due to the fact that over 36% of American businesses (and 72.9% of businesses with over 1,000 employees) have a biweekly pay schedule (Burgess, 2014). Effects remain largely unchanged.
40In addition, we may expect that suppliers are able to anticipate demand and displace crowding through higher prices on SNAP receipt days. Recent evidence suggests that Illinois grocers did not change prices as a result of SNAP benefit staggering, indicating that SNAP beneficiaries likely crowd out other customers on receipt days (Goldin et al., 2016).
41Moreover, if large stores experience crowds every day of the month, they may be less likely to respond to changes in SNAP policy. See table A11 for an analysis of the effects of staggering benefits in Census tracts with supermarkets. Estimates are similar to the main results and indicate an overall reduction in grocery store crime and theft driven by reductions from the 2nd to the 23rd. Another alternative explanation is that when the number of SNAP issuance days increases, stores respond by stocking less fresh or perishable (i.e., more “valuable”) items near the beginning of the month due to the drop in potential customers, which incentivizes less crime. However, when analyzing effects for Census tracts with supermarkets (table A11), which sell fresh food more consistently, we do not find evidence for such an effect.
42Importantly, we estimate similar reductions in street theft and theft at retail stores and residences, suggesting that the reporting of theft was not affected by the policy change.
out on the 1st of the month; after, benefits were spread over the 1st to the 23rd. We test for discontinuous changes at the time of this policy and find that crime and thefts at grocery stores fall by approximately 18% to 21% after the policy change, corresponding to 2.5 fewer grocery store crimes across the city per day. Our results show that reductions in criminal behavior at grocery stores spill over to other crimes as well; we estimate that staggering SNAP benefits led to approximately 43 fewer crimes in Chicago, driven by a reduction of 26 fewer thefts per day, or nearly 9,500 thefts per year. We find no evidence to support the idea that changes in crime detection are responsible for the drop in reported crimes.

Given the fact that the incidence of grocery crimes not only falls on the first of the month but remains lower throughout the month after the policy change, it is likely that better to smoothing of food consumption leads to both less economic activity at the beginning of the month and also less financial desperation at the end of the month. Moreover, increasing the number of SNAP distribution days reduces the chance that groups of individuals in low-income communities all receive benefits at the same time. Therefore, staggering SNAP benefits has the potential to eliminate or reduce the presence of negative peer effects within communities caused by simultaneous income shocks. Such distribution schedules also have the potential to aid in community-level consumption smoothing, reducing the need for residents to commit crimes to obtain basic resources. Given the evidence that staggered cash transfers from programs like TANF can reduce crime by 21% (Hsu, 2016), our estimates fit into a broader literature on how changing the timing of other government transfers can affect total social welfare.

We also analyze how the benefit month and calendar month vary and find that criminal activity is highest in the first and fourth weeks after SNAP issuance, with a decrease of 4.1% in the third week after disbursement. We document evidence of a quadratic relationship between SNAP benefits and criminal behavior, where crime increases immediately after SNAP receipt and again at the end of the benefit month. While we find effects of SNAP disbursement on overall crime level, we do not see effects for drug crimes. Conversely, we find that alcohol-related crime peaks just before benefit issuance (73.9%) due to informing beneficiaries of the upcoming change. According to Heaton’s (2010) estimates of the costs of crime, staggering SNAP issuance led to over $1,442,000 in annual benefits for the city of Chicago just in grocery store theft reductions alone. This estimate does not take into consideration spillover effects on other types of thefts or crime in general, which would imply that such policies vastly outweigh the cost of implementation.

Finally, we note that deliberately scheduling the delivery of benefits so that families receive transfers over the course of the month would benefit families and communities more broadly. Careful scheduling of other transfers families receive in conjunction with SNAP (such as wages from work or TANF) could also help to alleviate consumption shocks, as could splitting families’ monthly benefits into multiple staggered payments.

REFERENCES
Castellari, Elena, Chad Cotti, John M. Gordonier, and Orgul D. Ozturk, “Does the Timing of Food Stamp Distribution Matter? A Panel-Data


