NBER WORKING PAPER SERIES

MOTHERS AS INSURANCE:
FAMILY SPILLOVERS IN WIC

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Working Paper 30112
http://www.nber.org/papers/w30112

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2022

This project was supported with a grant from the Robert Wood Johnson Foundation program on Evidence for Action: Investigator-Initiated Research to Build a Culture of Health. We thank seminar participants at Cornell, UC Davis, UC Riverside; conference participants at the Southern Economic Association, NBER, ASSA, and the Institute for Poverty Research; and Melanie Guldi and Diane Schanzenbach for useful comments. Annie Laurie Hines and John Iselin provided excellent research assistance. The findings and conclusions in this paper are those of the author(s) and do not necessarily represent the views of the Research Data Center, the National Center for Health Statistics, or the Centers for Disease Control and Prevention. It does not represent the opinions of any organization. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

At least one co-author has disclosed additional relationships of potential relevance for this research. Further information is available online at http://www.nber.org/papers/w30112.ack

Mothers as Insurance: Family Spillovers in WIC
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NBER Working Paper No. 30112
June 2022
JEL No. H51,H53,I18,I38

ABSTRACT

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a widely used program. Previous research shows that WIC improves birth outcomes, but evidence about impacts on children and families is limited. We use a regression discontinuity leveraging an age five when children become ineligible for WIC and examine nutritional and laboratory outcomes for adults and children. We find little impact on children who aged out of the program. But among adult women caloric intake falls and food insecurity increases, suggesting that mothers protect children by consuming less themselves. We find no effect on others in the household.

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The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is one of the most widely used U.S. food assistance programs, with nearly half of all infants participating. In fiscal year 2021, the program served 6.2 million people at a cost of $5.0 billion (U.S. Department of Agriculture, 2022). WIC provides vouchers to low-income pregnant and postpartum women, infants, and children under age five that can be used to purchase specific nutritious foods. Prior research has focused on the effects of WIC during pregnancy and shows that WIC improves birth outcomes.[1] However, we know little about the effects of WIC for children ages 1 to 4, who account for more than half of WIC participants, or about spillovers to other family members.

This paper evaluates the impact of a child *aging out* of WIC at age five. Fifteen percent of children receive WIC just before their fifth birthdays, when they become ineligible. Using administrative records, we first show a strong decline in WIC participation at age five.[2] Our main analysis using restricted-use data from the National Health and Nutrition Examination Study (NHANES) captures measures of nutrient consumption, diet quality, biomarkers from laboratory tests, and food security. We find the loss of WIC benefits has little effect on the categorically-eligible and likely income-eligible children as they age out of the program. Instead, women who live with the children (specifically, adult females aged 20 to 50, most of whom are likely to be the children's mothers) cushion WIC loss by consuming less themselves, in particular by consuming fewer calories. These households show no change in child food insecurity but an increase in adult food insecurity. These findings show one way that mothers buffer the impact of fluctuations in household resources on children.

We estimate regression discontinuity (RD) models, using the sharp cutoff in WIC

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[1] See reviews by Currie 2003, Hoynes and Schanzenbach 2015, and Bitler and Seifoddini 2019.
[2] We discuss below the exact timing of the end of the benefits.

eligibility at age five. The RD estimates compare child outcomes just before the cutoff to outcomes just afterwards, controlling flexibly for a polynomial in age in days. Using data from the Survey of Income and Program Participation (SIPP) as well as NHANES, we show that there are no discontinuous changes in other social, educational, or nutritional programs at age five, supporting a causal interpretation of the RD estimates.[3] The restricted-use NHANES data allow us to link children to other household members as well as to measure child age in days. This household roster data allows us to test for the direct effects of aging out of WIC on children as well as spillover effects on other household members.

This research adds to the small literature about the effects of WIC on children (Arteaga, Heflin, and Gable 2016; Cho, 2022; Frisvold et al. 2020; Si and Leonard 2020; and Smith and Valizadeh 2018). We extend this work (discussed further below) in several ways. First, we use a quasi-experimental design with strong internal validity -- regression discontinuity – and precise data on the timing of the NHANES interview and birth dates to look at the impacts of WIC for child outcomes beyond food insecurity, including diet and health. Second, to our knowledge we are the first to test for spillover effects of WIC onto other family members. Many in-kind benefit programs target a specific person (e.g., school meals, Supplemental Security Income, Medicaid) but could impact other household members by relaxing budget constraints or by supplying goods that could be consumed by others. Two recent studies find that children's Medicaid access impacts maternal health behaviors, labor and marriage market outcomes (Grossman et al., 2021; Kunze 2022). However, most studies investigate spillovers from parents to children; only 1% of spillover papers ask how programs for children impact parents (De Neve and Kawachi, 2017). Our results regarding WIC offer an interesting example of this phenomena.

[3] There is also a discontinuity in the data at age 1, when value of the WIC package falls, and children need to get recertified to receive additional benefits. However, eligibility for Medicaid also changes at this point.

II. Background: WIC and Previous Studies

WIC provides vouchers (or electronic debit cards) for specified foods containing key micronutrients that are frequently under-consumed, including iron, calcium, and potassium. WIC also mandates nutritional education and provides referrals to other programs. People eligible for WIC include pregnant, post-partum, or nursing mothers/persons; infants; and children younger than five. Participants must have household incomes less than 185 percent of the federal poverty line or participate in Medicaid, the Supplemental Nutrition Assistance Program (SNAP), or Temporary Assistance for Needy Families (TANF). Participants must also be "at nutritional risk," but in practice, most applicants are deemed at risk. WIC participants face a "cliff": Recipients receive the full WIC package unless and until they lose eligibility (U.S. Department of Agriculture, 2022). Immigrants are eligible for WIC under the same circumstances as citizens.[4]

Appendix Table A1 shows the current WIC food bundle for children, valued at $35.56 per child per month in FY 2021. Children receive vouchers for specific quantities of milk, 100% fruit juice, breakfast cereals, eggs, whole wheat bread, and legumes or peanut butter. Starting in 2009, WIC child benefits also include a cash value voucher for fresh, frozen, or canned fruits and vegetables without added sugars. Allowable foods are very specific. For example, breakfast cereals must be low in sugar and fortified with iron, and juice must be unsweetened.

Most of the existing literature focuses on the impact of WIC on birth outcomes; and does so by comparing participants and non-participants. However, participants tend to be needier than non-participants even within the population of eligibles, which casts doubt on these designs (Currie 2003; Bitler and Currie, 2005). Stronger designs include using the initial roll-out of WIC in the

[4] Only Indiana excludes non-citizens.

1970s (Hoynes, Page, and Stevens, 2011), clinic closures (Rossin-Slater, 2013), sibling comparisons (Kowaleski-Jones and Duncan, 2002; Chatterji et al., 2002; Foster et al., 2010), non-parametric bounds (Kreider, Pepper, and Roy, 2016), or more narrowly defined treatment and control groups (e.g., Joyce et al. 2005, 2008; Figlio et al., 2009, and Currie and Rajani, 2015).

The impact of WIC on children is less well understood. A few previous investigations use a similar RD approach, with mixed results. Arteaga, Heflin, and Gable (2016) use the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) data to look at effects of losing WIC eligibility on household food insecurity. They find that food insecurity increases when children lose WIC eligibility. Si and Leonard (2020) use data from a Dallas food bank and find that aging out led to an increase in food bank utilization. Smith and Valizadeh (2018) use the public use NHANES data and find no effects of leaving WIC on food insecurity or measures of healthy eating.[5] Frisvold, Leslie, and Price (2020) ask whether changes to the food package led to lasting changes in food choices post-eligibility. Cho (2022) asks how aging out of WIC interacts with school meals using Current Population Survey data on food security and school enrollment.

We build on these studies in three ways. First, we use the confidential NHANES data which includes exact date of birth and date of interview rather than coarser measures of age. We also have a national sample with repeated cohorts (rather than a single cohort as in the ECLS-K) as well as results from medical exams and a wide range of nutritional outcomes, including, but not limited to food security.

Second, we examine the spillover effects of child WIC participation on other family members' food consumption, biomarkers, and food security. This investigation speaks to the extent

[5] They do find a negative effect on the healthy eating index when they exclude children who regularly consume school meals. We explore the robustness of our findings with the subset of children who are not facing the end or start of the school year and find that excluding them has little effect on our results.

to which adult women in the household (likely mothers) are able to buffer the impacts of food insecurity on children.[6] Finally, since we know when the interviews occur, we can explore the importance of the start and end of the school year to the estimates.

III. Data

Nutrition and consumption: Data on consumption and health outcomes come from the NHANES III, conducted from 1988 through 1994, with about 40,000 interviews total, and from the continuous NHANES, with 5,000 interviews each year between 1999 and 2014. These nationally representative data are the main source of information about the health and nutritional status of American adults and children. We pool all waves of NHANES data spanning the years 1988-2014 and use all of the data available for each measure. The available data vary from year to year as some measures are not collected in every wave or for every age (for more detail, see the online appendix).

Respondent interviews provide information on demographics and food insecurity. Food diary recalls provide up to two days of detailed consumption information for individual family members. NHANES uses these food diaries to determine nutrient intake. Physical examinations provide medical, dental, and physiological measurements.

Laboratory tests for selected household members provide health and nutrient measures based on blood and urine tests, all conducted by trained medical personnel. We use the NHANES laboratory data to construct outcomes for hemoglobin, hematocrit, and anemia (measures of iron sufficiency) and cotinine (a biomarker that indicates exposure to nicotine smoke) as these

[6] Martin-Anderson (2014) finds that adult men in WIC households consume more WIC foods, but we did not find any impact of the child exiting WIC on the consumption of adult men. However the sample of adult men residing with sample children is smaller than the sample of adult women or the sample of siblings.

outcomes could change from one month to the next.[7]

We construct measures of child and adult food insecurity (severe, moderate), total calories per day, and the Healthy Eating Index (HEI) as a summary measure of diet quality. HEI is calculated using the 2015 version (Krebs-Smith et al., 2018) and is available for respondents interviewed in 2005 onwards. We also examine impacts on milk consumption, chosen because it is a food item included in the WIC basket which is important for child nutrition.

Food insecurity is assessed using the standard USDA 18-item questionnaire. Some questions apply only to adults and others apply only to children, which allows separate measurement of food insecurity for children and adults within a household (see Bickel, 2000).[8] The severity of food insecurity ranges from worrying about running out of money to purchase food to having household members who had to skip meals. Having children skip meals is considered the most severe form of food insecurity.

We utilize the restricted-use NHANES household roster which includes the exact birthdate and interview date for all household members, including members who were not selected for an interview. These data play two critical roles. First, they allow us to measure child age in days and thus to identify the effect of losing access to WIC at age five precisely. Second, we can identify families with a child aging out of WIC and examine spillovers onto other household members.

We analyze three main samples, one for "focal" children, and one each for adult women or older children who were selected for interview from the same households. Importantly, the NHANES does not interview every household member, so these "spillover" samples are smaller. The child sample consists of children living in families with annual incomes less than 200% of the

[7] We do not use body measures such as height, weight or BMI as they are unlikely to change rapidly.
[8] Although the NHANES measure of food insecurity refers to experiences during the previous calendar year, this annual measure has been shown to respond to recent events (Gregory and Todd, 2020).

federal poverty guidelines who are income-eligible for WIC.[9] Age is the difference between the interview (or examination) date and the child's birthdate. All samples are limited to households with only one child within 719 days (approximately 24 months) of the age five WIC cutoff so that we can assign a unique RD running variable to all household members. The RD running variable, age in days, is defined as the number of days relative to the last day of the month the "focal child" turned five.[10] This date is treated as the WIC benefit termination date for all household members.

The second sample includes adult females ages 20 to 50, and the third includes children 7 to 17 in a household with a focal child. The NHANES household roster does not include relationships between household members, only date of birth. However, the sample of adult women is likely to often include the child's mother. The three estimation samples include a maximum of 4434 children aged 3 to 7; 1143 adult women aged 20 to 50; and 2235 older siblings, respectively.

Means of the dependent variables are included in Appendix Table A2. On average, young children in the focal child sample consume 1,676 calories a day, within the recommended range of 1,200-1,800 calories. Diet quality, as measured by the HEI, averages 52.7 out of 100, compared to 59 for the average American (USDA, 2019). Adult women have a slightly lower average HEI score of 50.04. In the focal child sample, 16 percent live in a household with moderate child food insecurity. The fraction living in a household with moderate adult food insecurity averages 26.7 percent. Severe food insecurity is relatively rare: Only 1.4 percent of households report that

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[9] Using 200% as our threshold helps to account for measurement error and the fact that income is collected in bins of \$5000. Income is measured at the time of the interview.

[10] For example, for any child born in June the termination date is June 30th. The running variable is -25 if the child is interviewed on June 5th, -5 if interviewed on June 25th, and 10 if interviewed on July 10th. We investigated WIC benefit disbursement practices by sending a short questionnaire to each state WIC office (see Online Appendix). While not every state ends benefits precisely on the last day of the month a child turns five, this cutoff should be close to the actual cutoff in most cases.

children skipped meals due to lack of food availability which foreshadows our result that households try to shield children from food insecurity. Appendix Table A2 also provides means of laboratory outcomes (blood and urine tests) for nutrient deficiencies and the presence of a nicotine metabolite (cotinine).

As shown in Table A2, some variables have smaller sample sizes for several reasons. First, many questions and some tests are administered only to sub-samples. Second, not all measures are available in every year or for every age group.[11] We focus on outcomes that might change quickly and that have large enough sample sizes that the results can be disclosed: Low levels of hemoglobin and hematocrit; anemia; and cotinine.

WIC Participation: To examine WIC participation at the 5-year cutoff, we use *WIC Participant and Program Data* (PC) from 1996-2016. These data represent a full accounting of WIC participants from administrative records collected in April of every even-numbered year. From this total, the analysis sample is a self-weighting public-use subset of around 60,000 children per year. Age in months is calculated from the child's month of birth and the fact that the data are reported in April. To construct WIC participation rates, we divide the WIC participation counts by the number of births in the appropriate month from the Vital Statistics Natality data.[12] The top left panel of Figure 1 presents these WIC participation rates by age in months. WIC participation rises between birth and 4 months, holds steady and then drops discontinuously at 12 months. It then declines smoothly starting around 15 months. By 60 months of age, when eligibility for WIC ends, approximately 15 percent of U.S. children are still on the program. Participation falls sharply at 61 months as eligibility ends.

[11] In addition, a few respondents refused lab tests, but this is a much less important cause of missing data.
[12] Alternatively, we can define participation rates by taking the ratio of the PC count of participants age 4 to the number of children under 200% of poverty at age 4 from the Current Population Survey to better approximate the relevant first stage for our NHANES analysis. This suggests a participation rate of 0.34.

Other program participation: We use the Survey of Income and Program Participation (SIPP) to examine whether participation in other means-tested assistance also changes at the end of the month when children turn five. Compared to NHANES, the SIPP has more information about program participation and a larger sample size. The SIPP data is treated as a repeated-cross section in order to maximize comparability with the NHANES.[13] We include households with monthly income less than 200 percent of the federal poverty guideline. Child age is measured in months in the SIPP and the sample is restricted to households with one child 37-84 months at the time of the interview. The sample includes data from the 2001, 2004, and 2008 SIPP panels, covering 2000-2013 and yielding a sample size of 48,373. Large fractions of this sample receive assistance from other programs. For example, 54 percent use Medicaid.

School Entry and Exit: Changes in the utilization of school meals programs around the fifth birthday are another potential confounder. We collected information about school entry and exit dates in order to assess the importance of this potential problem and concluded that only a relatively small number of children have birthdays close to school beginning and ending dates. Further, most schools do not start on the first day of a month, when WIC benefits typically end. However, to alleviate concerns about possible confounding from this source, we conduct robustness tests dropping all NHANES interviews conducted at the start (August and September) and end (May and June) of the academic year.

We also use data for the first 3 waves of the 2014 SIPP panel (covering calendar years 2013 through 2015) to ask whether school enrollment changes discontinuously after 60 months. Beginning in the 2014 SIPP, all children 3 and older were asked about whether they attended any

[13] Since there is a higher prevalence of response errors in SIPP months other than the survey month (Kalton et al., 1990) we use data from survey months only.

sort of school or preschool.[14] The sample includes all observations on children 36-84 months old in families with incomes less than 200% of the federal poverty line. Again, we exclude households with more than one child in this age range which leaves us with 4,247 unique observations.

IV. Research Design

For all outcomes, we estimate models of the form:

$$(1)\ Y_i = \beta_1 + \beta_2 * AGEGT5_i + \beta_3 * f_1(Age_i) + \beta_4 * f_2(Age_i) * AGEGT5_i + \varepsilon_i,$$

where Y_i is an outcome of interest for individual i, Age_i is the age of the focal child in days (NHANES) or months (SIPP) relative to the end of the month in which the child turns 5, and *AGEGT5* is an indicator equal to 1 after the last day of the month in which the child turns five (NHANES) or 61 months (SIPP). The coefficient of interest, β_2, is the estimated treatment effect of losing access to WIC at the age cutoff. We specify a triangular kernel, which down weights observations that are further from the point where effects are being estimated and thus down weights data far from the cutoff (Fan and Gibjels, 1992). In the base specification, the polynomials $f_1(Age_i)$ and $f_2(Age_i)$ are modeled as a cubic in age so that β_3 and β_4 flexibly capture changes in outcomes with child age. They are estimated separately on either side of the discontinuity. Since the RD framework compares outcomes for families that have recently aged out of WIC to those that are approaching the benefit termination date, these estimates should be interpreted as short-term effects and may not capture the full effect for outcomes that result from cumulative changes over a longer period of time.

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[14] In previous SIPP waves, questions about preschool are asked about those less than 5 and questions about school are asked to those 5+ but these two sets of questions are generally not asked in the same waves.

The RD design takes advantage of the sharp change when children's WIC eligibility ends It compares children close to aging out (and their household members) to those who have recently aged out while controlling smoothly for age in days. The validity of this approach requires that there be a sharp change in WIC program participation at the end of the month the child turns age five (we refer to this as age five from here on out), but that other confounders, including participation in other social, educational or nutrition programs, move smoothly across the age five threshold. The SIPP data allow us to investigate this key assumption.

In addition to the RD estimates, we also present RD graphs for many of the outcomes. These graphs plot both the predicted effects from the fitted cubic polynomials on either side of the cutoff, as well as the weighted point estimates and confidence bands for the midpoints of bins to the right and left of the cutoff.

All regressions are weighted with survey weights for the relevant data component (SIPP person weights or NHANES interview or examination). Standard errors are clustered on day of exam/interview to account for any correlations in the errors in observations taken on specific interview or exam days (or months for SIPP).

IV. Results

a) Validity of the RD approach

The RD identification strategy relies on three assumptions. First, is there must be a sharp change in the treatment variable at the discontinuity. Column 1 of the first panel of Table 1, reports the effect of turning five on WIC participation rates using the WIC administrative data. As discussed previously in the context of Figure 1, WIC participation falls by 14.6 percentage points at age 61 months.

Second, it must not be possible for individuals to manipulate whether they fall on one side of the discontinuity or the other. Since child age is easily verifiable by caseworkers, it is unlikely that such sorting is a problem in our context. McCrary density tests for excess bunching on one side of the cutoff fail to reject that there is excess bunching for the focal child sample or for the sample of adult women, with the p-values being 0.165 for children and 0.191 for women.[15]

Third, there must be no other discontinuous change at the cutoff. The estimates in columns 2-8 of the first panel of Table 1 present RD estimates of participation in other safety net programs using the SIPP data. To be clear, children who are simultaneously enrolled in other assistance programs are not a threat to identification; their enrollment only presents difficulties if it changes discontinuously at the end of month in which children turn five. These estimates show no economically or statistically significant evidence of a change in any of the other social safety net program participation rates at the cutoff. The RD graphs for the two programs with the highest participation rates in our sample – Medicaid and SNAP– are shown in panel A of Figure 1 and show smooth participation through the threshold.

Panel B of Table 1 shows balance tests of demographic characteristics for the NHANES focal child sample of children 3 to 7. Here again, there are no discontinuities in the household reference person's education or gender, nor in the child's gender, race, or ethnicity. We also construct a measure of predicted adult food insecurity in the child's household by estimating a probit model of moderate adult food insecurity as a function of the other demographic variables shown in Panel B. The estimated coefficients are then used as weights to create an index of predicted food insecurity over the whole sample. This index varies smoothly through the threshold, suggesting that there are no household changes that would predict higher adult food

[15] The McCrary test uses rddensity. Thus, it does not account for the survey weights as they are not incorporated into the CCT software conceptually or in practice.

insecurity.

Similar balance tests for the adult woman sample are presented in Appendix Table A3. Here, one of the five demographic characteristics is statistically significant at the 1% level across the discontinuity – suggesting a reduction in the share of household heads who have less than a high school degree - and one is statistically significant at the 10% level – suggesting an increase in the probability of being Black. These differences work in opposite directions in terms of what they suggest about the likelihood of food insecurity or a poor diet. The predicted food insecurity measure, which incorporates the impacts of all of the demographic variables has a very small and statistically insignificant coefficient. The RD plots for predicted food insecurity in the child and adult women samples (Figure A1) reflect the smoothness shown in Tables 1 and A3.

Finally, we ask whether school enrollment changes discontinuously at age five, because that could change access to school meals. Since the school year typically begins in August or September and birth dates occur throughout the year, there should not be any systematic relationship between turning age five and entering (or exiting) school for most children. Appendix Figure A2 shows a histogram with the share of children enrolled in either preschool or kindergarten by age in months using data from the SIPP for 2013-2015 as described above. The figure shows that school enrollment varies smoothly through the threshold.

The overall evidence strongly supports the validity of the RD approach. We conclude that there is a strong first stage, no manipulation around the threshold, that the sample is balanced across the threshold, and that the results are not confounded by simultaneous changes in participation in other programs or in school enrollment.

b) Main RD Estimates of Effect of WIC

The main estimates of the effects of WIC in the focal child sample are shown in Panel A of Table 2. The point estimates show only small changes in nutrition for children ages 3 to 7 (e.g., an increase of 9 calories relative to the mean of 1,676 calories per day). The estimated effects on child food insecurity are also small and statistically insignificant. All of the child outcomes except the HEI are statistically insignificant, with the HEI estimate actually suggesting an improvement at the 10% level of confidence. These results strongly suggest that children are not changing their consumption of a key WIC package ingredient (milk), overall calories, or nutrients as measured by biomarkers (anemia, hematocrit, or hemoglobin), and the income effect does not seem to be causing the adults around them to change their smoking behavior. Panel B of Figure 1 shows RD graphs corresponding to the estimates for the child sample. They do not show any statistically significant jumps in any of the child outcomes.

Panel B of Table 2 explores the impact of a child aging out on the sample of adult women 20 to 50. This sample shows large increases in both severe and moderate food insecurity, as shown in columns 1 and 2.[16] In addition, we find large and significant reductions in adult calories although there is no significant change in the healthfulness of adult diets as measured by the HEI. There are no statistically significant effects on women's consumption of milk, nor are there changes in the lab tests.

Figure 2 shows RD graphs for the adult woman sample. The first sub-figure shows a clear jump in moderate food insecurity at the cutoff. The third sub-figure shows a drop in total calories at the cutoff. The remaining figures do not show clear discontinuities, consistent with the estimates

[16] It is also possible to examine the effect of aging out on adult food insecurity in the larger focal child sample, as shown in Appendix Table A4. We find significant effects on moderate adult food insecurity in this sample as well. It is important to note that not all of the adults in the child sample households are NHANES respondents while those in the adult woman sample are all survey respondents.

shown in Panel B of Table 2. Note that small cell sizes prohibited showing figures for all outcomes, and in a few graphs, some dots representing small cells are not shown.

In summary, Panel A of Table 2 and Panel B of Figure 1 show that there is no immediately measurable impact on the nutritional outcomes of the children who are aging out of WIC. However, this may be because adult women in the household (who in many cases are their mothers) reduce their own consumption in order to buffer children from the consequences of losing access to WIC benefits, as shown in Panel B of Table 2 and in Figure 2.

To put these results in perspective, one useful comparison is to the Summer Electronic Benefit Transfer for Children (Summer EBT) demonstration. This demonstration gave treatment families a monthly benefit of $60 during the summer months that could be used on any food item in the grocery store (similar to SNAP) to help them replace school meals. This demonstration reduced adult food insecurity from 50 to 41 percent, a reduction of 18.5% of the baseline (Collins et al., 2016). Thus, the effects for this comparably-sized program are in the same direction, but slightly smaller than our findings as might be expected given that there was a substitute program (the summer feeding program) which about 16 percent of the demonstration children utilized.

We have also explored possible spillovers onto other groups of household members. For example, RD estimates for the sample of older children (aged 7 to 17) in households with focal children aged 3 to 7 are shown in Appendix Table A5. The estimates show that there are no impacts on older siblings when younger siblings age out of WIC.

Our results suggest that when the household loses WIC benefits, mothers ensure that children's consumption does not suffer. They do this by consuming less themselves, thereby providing insurance to their children. It is notable that there are no adjustments in the consumption of older children in the households.

VI. Robustness

We explored the robustness of our estimates to a number of sensitivity checks. First, Table 3 shows estimates for the focal child sample (Panel A) and the adult woman sample (Panel B) when we exclude interviews that took place near the start or end of the school year (those in May, June, August, and September). This check addresses concerns about changes in access to school meals programs coinciding with children aging out of WIC. The results are very similar between the main and alternate samples. We show once again that there is little impact on children, but a strong increase in adult food insecurity in these households.

Appendix Table A6 shows that our results are robust to several alternative specifications including: Using linear models with the triangular kernel; adding demographic controls (race, ethnicity, whether the household reference person has less than a high school degree) to the cubic polynomial; and using an optimal bandwidth (Calonico, Cattaneo, and Titiunik 2014).

VI. Conclusions

This study contributes to a small literature examining the impact of WIC on children's nutrition. We take advantage of a sharp break in eligibility for WIC at age five and use regression discontinuity methods to analyze the effects of aging out of the program. Our project contributes to existing work by using more precise estimates of child age, a broader array of outcome measures, and by examining both the direct effects on children and possible spillover effects on other household members, all in a similar framework. These improvements are possible due to the use of confidential NHANES data that includes exact ages, food diaries, blood, and laboratoryderived nutrition measures, and complete household rosters that allow children to be linked to their likely mothers and other household members.

The estimated effects are identified by children who remained on WIC until their fifth birthdays and lose benefits by the end of that month. Chorniy, Currie, and Sondchak (2019) describe the characteristics of these children and document patterns that are consistent with mothers taking the costs and benefits of participation into account. Children with younger siblings (and therefore larger household benefit entitlements) are more likely to stay on WIC until age five, as are the children in the poorest households. These results suggest that we may be identifying the impact of WIC in the largest and highest need families.

We find little direct effect of aging out of WIC on the nutrition of children who lose enrollment. However, adult women 20 to 50 (including the likely mothers) experience greater food insecurity and reduce their own consumption (calories) when the child's WIC eligibility ends. There are no impacts on other demographic groups in the household such as older siblings. These results shed light on the ways households cope with the loss of resources from WIC: Mothers reduce their own consumption in a way that protects their children.

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Table 1: RD First Stage, Possible Confounders and Balance Tests

Panel A: First Stage (PC) and Possible Confounders (SIPP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WIC Participation Admin Data (PC)	Other Social Safety Net Participation (SIPP)						
	WIC	SNAP	Medicaid	TANF	Subsidized Housing	Social Security	SSI	Utilities or Energy asst.
Age > 60 months	-0.146***	0.012	0.015	0.008	-0.002	-0.001	0.003	-0.003
	(0.026)	(0.020)	(0.009)	(0.008)	(0.009)	(0.008)	(0.007)	(0.007)
DV Mean	0.115	0.370	0.541	0.072	0.135	0.100	0.062	0.147
N	48	48373	48373	48373	48373	48373	48373	48373

Panel B: Balance Tests (NHANES)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Household Reference Person		Child				Household
	<HS Degree	Male	White	Black	Mexican	Male	Predicted Adult FI
Age > 60 months	-0.097	0.008	-0.035	0.003	0.067	-0.016	0.025
	(0.082)	(0.097)	(0.092)	(0.058)	(0.059)	(0.094)	(0.020)
DV Mean	0.332	0.474	0.471	0.200	0.179	0.499	0.260
N	4442	4473	4473	4473	4473	4473	4285

Notes: Each cell presents the coefficient of interest (β_2) from estimating the cubic specification of the running variable in Equation (1), where the threshold is the end of the month the child turned 60 months. Standard errors (in parentheses) are clustered by age in months. Column 1 of Panel A is estimated using WIC administrative Program Characteristics data from 1996 to 2016 for even years, where each observation is the fraction of children that age who are enrolled in WIC with the denominator coming from Vital Statistics data on births of that age in months. The remaining columns of Panel A use a sample from the SIPP and Panel B uses a sample from the NHANES. The samples are limited to families living at <200% of the FPL and that have one child between the ages of 3 and 7. Observations are weighted using SIPP or NHANES sampling weights (differs by outcome). The bandwidth is 24 months (SIPP) or 719 days (NHANES) and the estimates use a triangular kernel. * p<0.10, ** p<0.05, and *** p<0.01.

Table 2: RD Estimates of Food Insecurity, Health, and Nutrition Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Food Insecurity				WIC Appr. Milk (g)	Exp. to Cig. Smoke	Hemoglobin (g/dL)	Hematocrit %	
	Severe	Moderate	HEI	Calories					Anemia
Panel A: Children, Ages 3-7									
Age > 60 months	0.000	0.102	4.604*	8.800	19.800	-0.911	0.039	-0.171	-0.031
	(0.011)	(0.099)	(2.552)	(94.999)	(39.363)	(0.849)	(0.198)	(0.542)	(0.040)
DV Mean	0.014	0.158	52.659	1675.918	283.354	1.177	12.677	37.159	0.071
N	2613	2613	1741	4297	4434	2440	3626	3626	3626
Panel B: Adult Women, Ages 20-50									
Age > 60 months	0.211**	0.426**	-1.038	-767.918***	-52.215	35.998	0.143	0.844	0.06
	(0.097)	(0.204)	(5.780)	(282.967)	(70.786)	(45.007)	(0.412)	(1.030)	(0.071)
DV Mean	0.129	0.288	50.039	1906.362	128.132	76.396	13.233	39.004	0.069
N	750	750	505	1142	1143	1000	1115	1115	1115

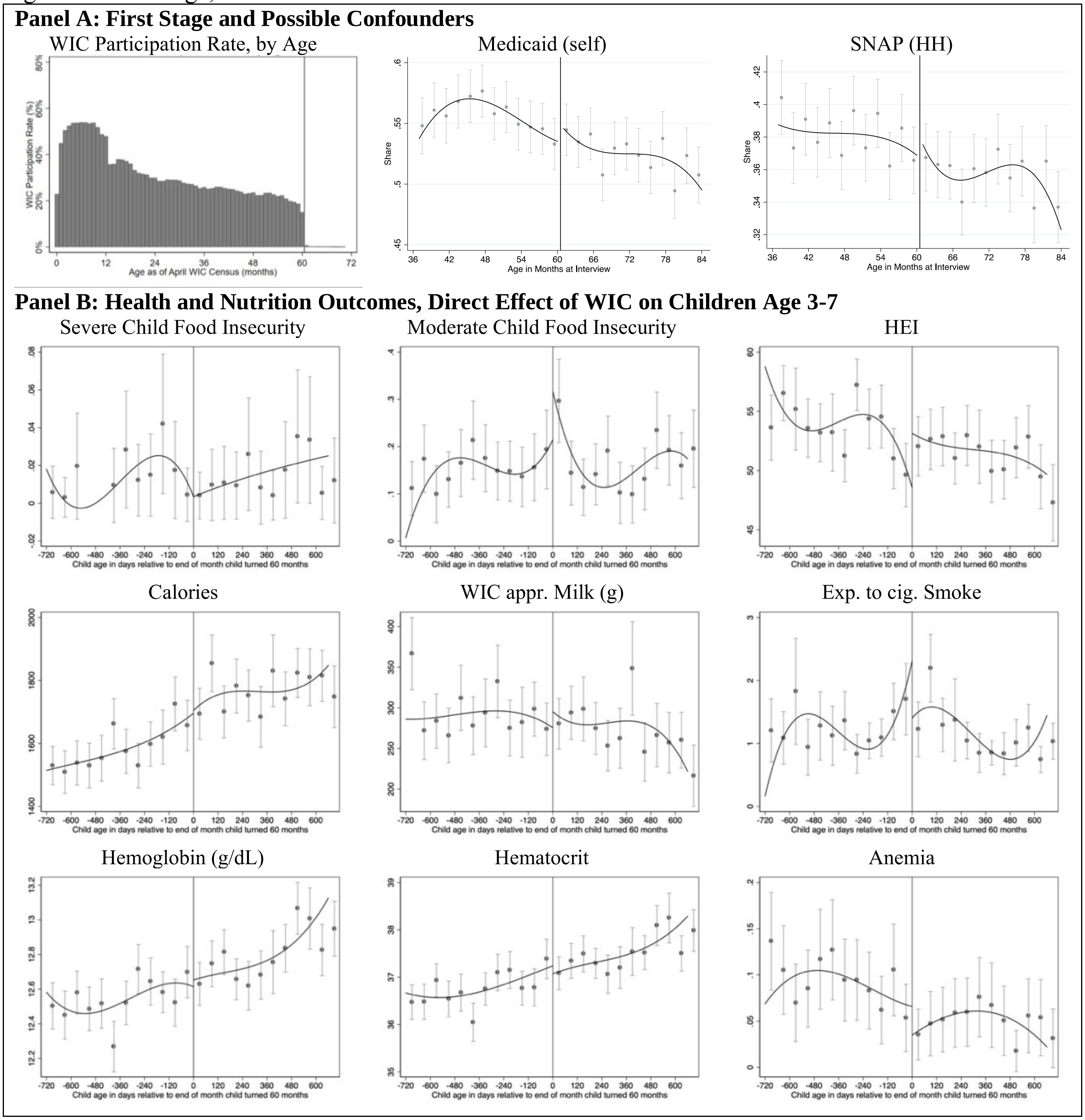
Notes: Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. Panel A gives the direct effect on children ages 3-7, while panel B gives the effect on women ages 20-50 living with a child ages 3-7. Each cell presents the coefficient of interest (β_2) from estimating the cubic specification of the running variable in Equation (1). Standard errors (in parentheses) are clustered by the day of exam/interview. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). In Panel A, food insecurity is measured for children living in the household and in Panel B, it is measured for adults living in the household. Calories and WIC approved milk averaged over two days of food diary. Exposure to cigarette smoke based on cotinine (ng/mL), which is a metabolite of nicotine measured in blood serum. Anemia is an indicator variable equal to 1 if hemoglobin<11.5 & hematocrit<35. The bandwidth is 719 days, and the estimates use a triangular kernel. * p<0.10, ** p<0.05, and *** p<0.01.

Table 3: RD Estimates, Excluding May, June, August, September

	(1)	(2)	(3)
	Main Outcome Variables		Balance Test
	Moderate Food Insecurity	Calories	Predicted Adult Food Insecurity
Panel A: Children, Ages 3-7			
Age >5	0.047	74.826	0.011
	(0.112)	(116.690)	(0.020)
DV Mean	0.156	1664.885	0.269
N	1899	2972	3186
Panel B: Adult Women, Ages 20-50			
Age >5	0.647***	-553.020*	0.007
	(0.170)	(284.595)	(0.038)
DV Mean	0.290	1916.597	0.274
N	530	785	813

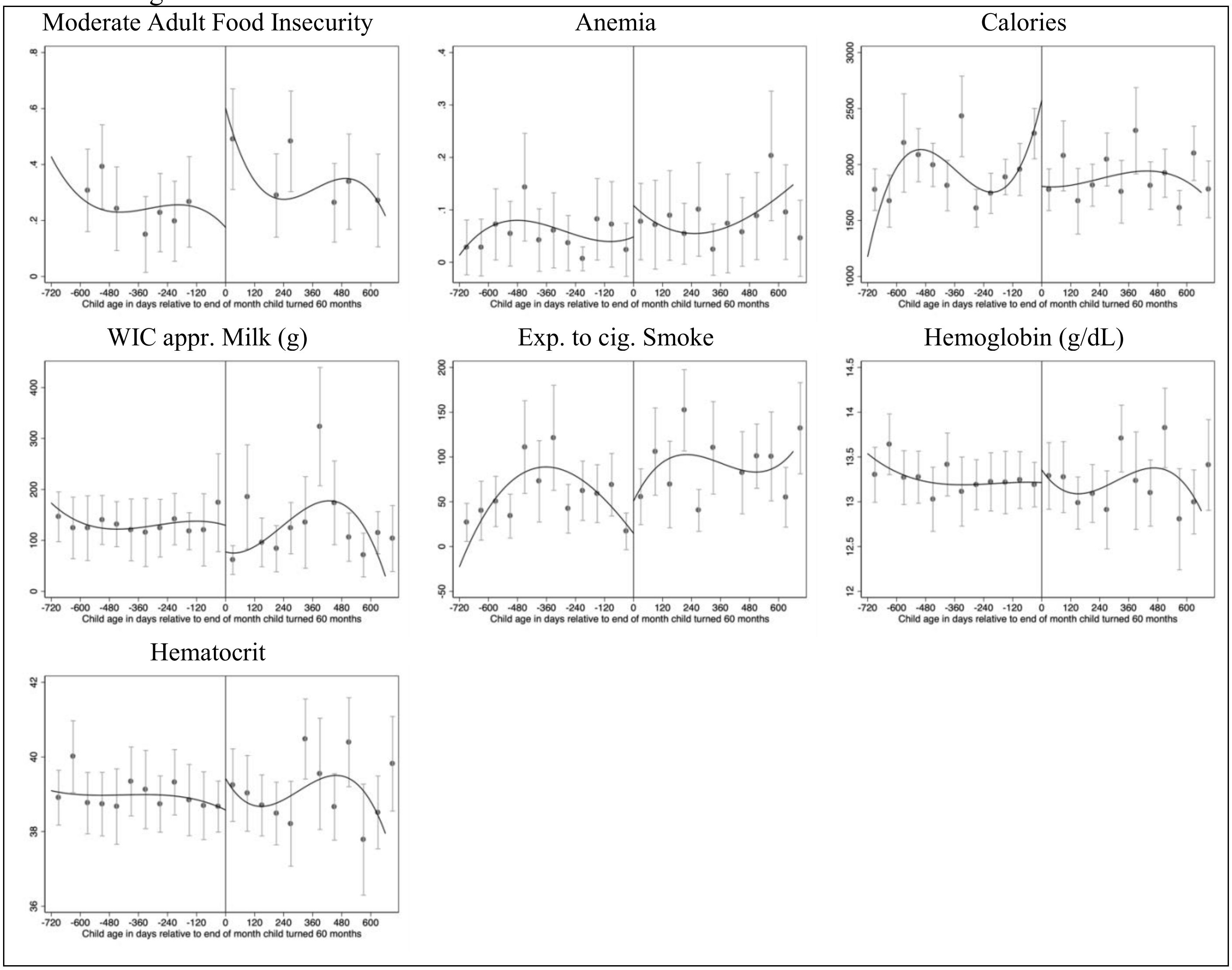
Notes: Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. Panel A gives the direct effect on children ages 3-7, while panel B gives the effect on women ages 20-50 living with a child ages 3-7. Each cell presents the coefficient of interest (β_2) from estimating the cubic specification of the running variable in Equation (1). In Panel A, food insecurity is measured for children living in the household and in Panel B, it is measured for adults living in the household. Calories are averaged over two days of food diary. Predicted Adult FI is a measure of predicted moderate adult food insecurity using demographic characteristics: age; race and ethnicity; whether the household reference person has less than a high school degree; and whether the child is male. Standard errors (in parentheses) are clustered by the day of exam/interview. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). The bandwidth is 719 days, and the estimates use a triangular kernel. * $p<0.10$, ** $p<0.05$, and *** $p<0.01$.

Figure 1: First Stage, Possible Confounders and Estimates of Health and Nutrition Outcomes for Children



Notes: The first figure displays the fraction of children at each age who are enrolled in WIC, with the numerator coming from WIC administrative Program Characteristics data from 1996 to 2016 for even years and the denominator coming from Vital Statistics data on births of that age in months. The remaining figures provide a visual representation of the estimation of the cubic specification of the running variable in equation (1) using SIPP (top row) or NHANES (remaining rows) data. Each dot on the figure represents the weighted mean of the outcome variable listed in the title, for children in that 60-day (NHANES) or 2-month (SIPP) bin, and the bars give the 95% confidence interval for the mean. The distance between the fitted lines gives the effect of aging out of WIC. Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. The bandwidth is 24 months (SIPP) or 719 days (NHANES) and the estimates use a triangular kernel. Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. Calories and WIC approved milk averaged over two days of food diary. Exposure to cigarette smoke based on Cotinine (ng/mL). Anemia is an indicator variable equal to 1 if hemoglobin<11.5 & hematocrit<35.

Figure 2: RD Estimates of Health and Nutrition Outcomes, Family Spillover of WIC on Adult Women Living with Child Aged 3-7



Each figure provides a visual representation of the estimation of the cubic specification of the running variable in equation (1). Each dot on the figure represents the weighted mean of the outcome variable listed in the title, for adult women ages 20-50 living with children in that 60-day bin, and the bars give the 95% confidence interval for the mean. The model, and the fitted line, come from the cubic specification of the running variable in equation (1). The distance between the fitted lines gives the effect of aging out of WIC. Any cell with fewer than 30 observations or with no variation is suppressed from the graphs. These disclosure restrictions do not affect the fitted polynomial line. Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. The bandwidth is 719 days, and the estimates use a triangular kernel. Calories and WIC approved milk averaged over two days of food diary. Exposure to cigarette smoke based on Cotinine (ng/mL).

Online Data Appendix for "Mothers as Insurance: Family Spillovers in WIC"

Here we summarize details of our data sources

I. National Health and Nutrition Examination Study (NHANES)

We use data from the NHANES III and the continuous NHANES. We use data on food security, diet based on food recall (for 1 or 2 days) converted to micro and macro nutrients and adequacy for individuals, and constructed health eating index data (a measure of how healthful the diet is per 1000 calories) from the interviews. We also use data from lab tests from the examinations, which provide some health and nutrition measures based on blood or urine tests.

Not all measures are available for every year or all groups. For example, the NHANES III does not include a measure of food insecurity for children and has a different measure than later NHANES for adults. Information used to compute the HEI is not available in all waves (we only have HEI from 2005 on). Consent is also obtained from adults and children over 12 for the interview and the examination part of the data collection, and from adults for children, and some interview questions are not answered by everyone. To take an example for 1999-2000, the sample screened and available for participation was 12,160 persons. The interview sample was 9965 persons and the examined sample was 9282 persons. (We note this is still a high response rate relative to many other surveys and all analyses use sample weights in order to account for non-response.) See https://wwwn.cdc.gov/nchs/nhanes/ResponseRates.aspx and https://wwwn.cdc.gov/nchs/nhanes/analyticguidelines.aspx.

We also note that not all tests are applied to persons of all ages. For example, the lab tests on blood measures are only done for the universe of persons 1 year old and older, while cotinine was only measured for those 3 years old and older. All of this contributes to the varying sample sizes.

II. WIC PC data and first stage calculation

All state and tribal agencies are required to send administrative data for the universe of WIC recipients to the CDC in April of even years, including information on date of last certification and demographic characteristics as well as measures of the food package prescribed and other details. We used these data to count how many children of each age in months participated using the difference between April of the year data is collected and the birth month and year (based on the requirement that April is the month the administrative data were sent to the CDC). This allows us to create the measure of the count of children of each age in the numerator of the rate calculations, the denominator comes from birth counts for that month from Vital Statistics. This gives us a first stage for all children. Our NHANES sample is restricted to children or others living with only 1 child aged 3 to 7 who has income under 200% of the poverty guideline (our proxy for eligibility which is tied to being under 185% of the poverty guideline but measured in ranges). So they are likely income eligible when it is before the end of the calendar month in which they turned 5, and not otherwise. We bring in data from the CPS ASEC to count how many children live in households with income under 200% of the poverty limit to match with the PC data to get an overall first stage that is relevant for applying to our NHANES estimates.

III. Survey of Income and Program Participation

We use data from the Survey of Income and Program Participation (SIPP) to examine participation in other means-tested income or in-kind assistance at the end of the month when children turn five. Very few of these programs are observable in the NHANES, and the SIPP provides a much larger sample. We analyze the SIPP data as a repeated-cross section in order to maximize comparability with the NHANES.[1] As with the NHANES data, our estimation sample includes households with monthly income less than 200 percent of the federal poverty guideline. We observe child age in months in the SIPP and restrict the sample to include households that contain one child who is between ages 37 and 84 months at the time of the interview, approximately the same ages as included in the NHANES data.[2] We use data from the 2001, 2004, and 2008 SIPP panels, covering the years 2000-2013 and providing substantial overlap with the NHANES data.

We also use the first three waves of SIPP 2014 panel to provide information on school enrollment by age, covering years 2013-2015. The SIPP was substantially redesigned in the 2014 panel, and these data are not directly comparable with earlier waves. New to the 2014 data is a question on whether each individual ages 3 and older was enrolled in school for each month of the year. We use each month of these data to determine whether children ages 37 to 84 months were enrolled in school (either preschool or elementary school) during a particular month. As with the other SIPP analyses, the sample is limited to households with monthly income less than 200 percent of the federal poverty guideline that contain one child who is between ages 37 and 84 months in a given month.

IV. WIC Program End and Disbursement Dates

Personal communication with WIC program personnel indicates that it would be administratively difficult to end benefits on the day a child turned 5 unless the day for benefit disbursal was the same as the birthday. Hence, children are likely to receive benefits for the month in which they turn five years old, but do not receive benefits after that month.

To determine the date of the month of WIC disbursements, we sent an email to each state's WIC office. The following questions were asked:

- Are WIC benefits disbursed on one date during the month (ex. All beneficiaries' benefits are disbursed on the first day of the month), or does disbursement occur throughout the month on a rolling basis?
- If all benefits are disbursed on one day, which day?
- If disbursement occurs throughout the month, what is the basis of when a recipient receives his/her benefits (birth date, SSN, last initial)?

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[1] That is, we do not incorporate the longitudinal nature of the data; instead, we treat each interview as a separate observation. Due to a known higher prevalence of response errors in months other than the survey month (Kalton et al., 1990) we restrict the sample to survey months.

[2] The SIPP provides information on each individual's month of birth and the date of the survey month. We calculate children's age in months as (surveymonth – birthmonth).

- If a child beneficiary is aging out of eligibility (turning 5 years/60 months old), when do the last month's benefits expire? For instance, if I have my 5th birthday on 8/15/2018, can I use my August benefits until the end of the month or do they expire immediately on my birthday?

Most states and the District of Columbia provided the requested information, though one did not respond and one refused to provide information. Thirty-four states have rolling disbursement (usually based on enrollment/certification) and fifteen use one date (first of the month). Of the 34 states with rolling disbursement, 11 have benefits that terminate at the end of the month. So 26 states in total (first of month states and terminate at the end of the month states) have benefits that terminate on the last day of the month. While in the other states benefits may not end precisely on the last day of the month a child turns five, this cutoff should be close to the actual cutoff in most cases.

III. School Start and End Dates

We collected data on the first day and last day of school for school districts across the country between 1988 and 2014. We used two approaches:

1) Beginning with a list of the 100 largest school districts in the country, we checked district webpages and news articles for mentions of the first and last day of school. This yielded 36 start dates and 22 end dates in 1988. The completeness of the dataset increased over time to more than 90% of each after 2007.

2) We searched online for complete state lists of dates, and if we found one, we also checked for historical calendars using the Wayback Machine Internet Archive (https://archive.org/web/). Finally, we called or emailed each missing state's Department of Education and asked them to share any lists of start and end dates that they had on file. We collected files from 32 states, with more coverage in the most recent years. District observations for both start and end dates increased from 112 in 1997 to more than 5000 in 2014.

The combination of these efforts resulted in more than 40,000 district/year observations. These dates were merged to the NHANES by county. In cases where we collected more than one district/date in a county, we used the date for the largest district in the county if it made up greater than 50% of enrollment and the weighted mean if the largest district made up less than 50% of enrollment. Enrollment data comes from the National Center of Education Statistics. This procedure resulted in start dates for 33 counties and end dates for 22 counties in 1988 and increased to 1653 and 1567, respectively, by 2014.

In each year, the last day of school fell in either May or June and the first day of school fell in either August or September for at least 90% of counties. The median start date got earlier over time, trending from the end to the middle of August and the median end date also trended slightly earlier over time, changing from the beginning of June to the end of May.

Table A1: WIC Food Package: Ages 1-4

Food Item	Quantity
Juice, single strength	128 oz
Milk*	16 qt
Breakfast cereal	36 oz
Eggs	1 dozen
Fruits & vegetables	$8.00 in cash value voucher
Whole wheat bread**	2 lb
Legumes OR peanut butter	1 lb dry or 64 oz canned (legumes); 18 oz (peanut butter)

"*Allowable options for milk alternatives are cheese, soy beverage, tofu and yogurt (partially). No whole milk for >2 years. **Allowable options for whole wheat bread are whole grain bread, brown rice, bulgur, oatmeal, whole-grain barley, whole wheat macaroni products, soft corn, or whole wheat tortillas."
Source: USDA Federal Register/ Vol. 79, No. 42/March 2014/; Rules and Regulations accessed https://www.govinfo.gov/content/pkg/FR-2014-03-04/pdf/2014-04105.pdf

Table A2: NHANES Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	Children 3-7		Adult Women		Older Siblings	
	Mean	N	Mean	N	Mean	N
Survey Outcomes						
Food Insecurity						
Severe Child	0.014	2613				
Moderate Child	0.158	2613			0.224	1656
Severe Adult	0.092	2621	0.129	750		
Moderate Adult	0.267	2621	0.288	750	0.314	1657
HEI	52.659	1741	50.039	505		
Calories	1675.918	4297	1906.362	1142	2030.231	2235
WIC appr. Milk (g)	283.354	4434	128.132	1143		
Laboratory Outcomes						
Exp. to cig. Smoke	1.177	2440	76.396	1000		
Hemoglobin (g/dL)	12.677	3626	13.233	1115		
Hematocrit (%)	37.159	3626	39.004	1115		
Anemia	0.071	3626	0.069	1115		

Notes: Each column presents the means and number of observations for the analytic sample listed at the top of the column. The child sample is limited to children between the ages of 3 and 7 in families living at less than 200 percent of the FPL who are the only child between the ages of 3 and 7. The adult women sample is limited to adult women ages 20-50 living in households at less than 200 percent of the FPL with one child between the ages of 3 and 7. The older siblings sample is limited to older children ages 7-17 living in households at less than 200 percent of the FPL with one child between the ages of 3 and 7. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). Calories and WIC approved milk averaged over two days of food diary. Exposure to cigarette smoke based on cotinine (ng/mL), which is a metabolite of nicotine measured in blood serum. Nonsmokers exposed to a typical amount of second hand smoke generally have readings <1, while active smokers have readings >10 (CDC, 2017). Anemia is an indicator variable equal to 1 if hemoglobin<11.5 & hematocrit<35. Due to disclosure limitations, means are only included in this table if they are also included in main RD estimates tables (Tables 4-6).

Table A3: NHANES Balance Tests, Adult Women Living with Child Aged 3-7

	(1)	(2)	(3)	(4)	(5)	(6)
	Household Reference Person		Adult Woman			
	<HS Degree	Male	White	Black	Mexican	Predicted Adult FI
Age >5	-0.544***	0.161	-0.069	0.175*	0.007	-0.008
	(0.165)	(0.144)	(0.190)	(0.099)	(0.119)	(0.030)
DV Mean	0.334	0.432	0.504	0.219	0.150	0.270
N	1153	1156	1156	1156	1156	1124

Notes: Limited to adult women ages 20-50 living in households at less than 200 percent of the FPL with one child between the ages of 3 and 7. Each cell presents the coefficient of interest (β2) from estimating the cubic specification of the running variable in Equation (1). Predicted FI is a measure of predicted moderate adult food insecurity using demographic characteristics: age; race and ethnicity; whether the household reference person has less than a high school degree; and whether the child is male. Standard errors (in parentheses) are clustered by the day of exam/interview. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). The bandwidth is 719 days and the estimates use a triangular kernel. * p<0.10, ** p<0.05, and *** p<0.01.

Table A4: Adult Food Insecurity for Child Sample Households

	(1) Severe Adult	(2) Moderate Adult
Age > 60 months	0.078	0.276***
	(0.053)	(0.099)
DV Mean	0.092	0.267
N	2621	2621

Notes: Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. Adult food insecurity is measured for adults living in the households of children in the main child sample. Each cell presents the coefficient of interest (β_2) from estimating the cubic specification of the running variable in Equation (1). Standard errors (in parentheses) are clustered by the day of exam/interview. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). The bandwidth is 719 days, and the estimates use a triangular kernel. * p<0.10, ** p<0.05, and *** p<0.01.

Table A5: RD Estimates for Older Siblings

	(1)	(2)	(3)	(4)
	Food Insecurity			
	Moderate Adult	Moderate Child	Calories 2 day Avg	Predicted Adult FI
Age > 60 months	0.274	0.176	15.170	0.030
	(0.175)	(0.198)	(203.059)	(0.026)
DV Mean	0.314	0.224	2030.231	0.302
N	1657	1656	2235	2130

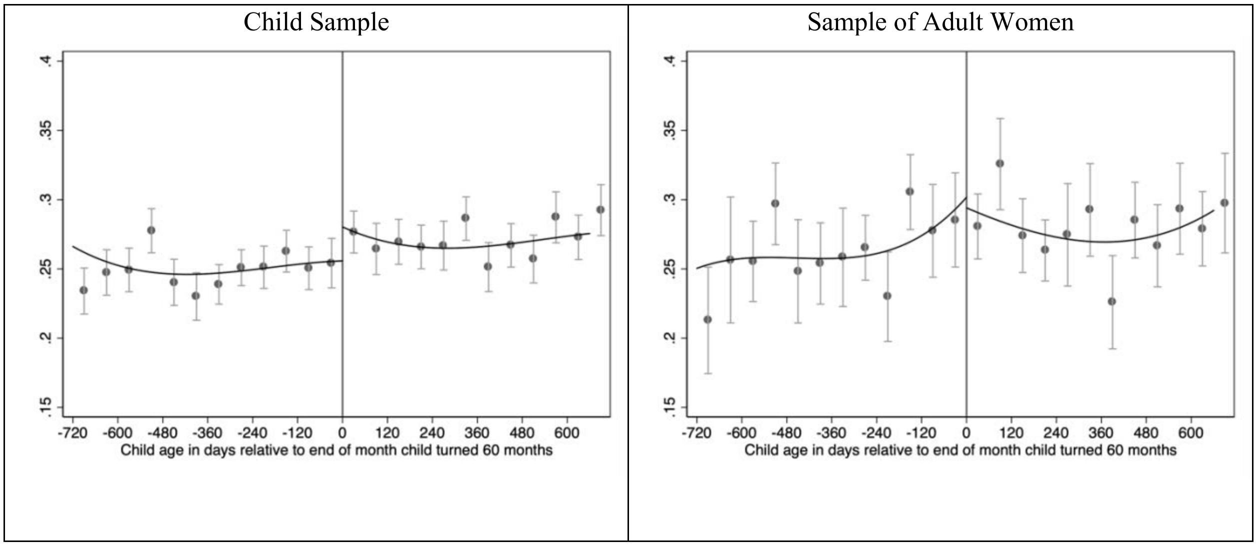
Notes: Limited to older children ages 7-17 living in households at less than 200 percent of the FPL with one child between the ages of 3 and 7. Each cell presents the coefficient of interest ($\beta 2$) from estimating the cubic specification of the running variable in Equation (1). Predicted FI is a measure of predicted moderate adult food insecurity using demographic characteristics: age; race and ethnicity; whether the household reference person has less than a high school degree; and whether the child is male. Standard errors (in parentheses) are clustered by the day of exam/interview. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). The bandwidth is 719 days and the estimates use a triangular kernel. * p<0.10, ** p<0.05, and *** p<0.01.

Table A6: Specification Robustness for Child Sample

	(1)	(2)	(3)	(4)
Polynomial	Cubic	Cubic	Linear	Cubic
Bandwidth	Main (719 days)	Optimal	Main (719 days)	Main (719 days)
Other Adjustments	NA	NA	NA	Covariates
Panel A: Moderate Food Insecurity (Child)				
Age > 60 months	0.102	-0.021	0.028	0.096
	(0.099)	(0.206)	(0.046)	(0.099)
DV Mean	0.158	0.170	0.158	0.158
N	2613	1166	2613	2613
Panel B: Moderate Food Insecurity (Adult)				
Age > 60 months	0.276***	0.385**	0.079	0.263***
	(0.099)	(0.161)	(0.050)	(0.099)
DV Mean	0.267	0.264	0.267	0.267
N	2621	1211	2621	2621

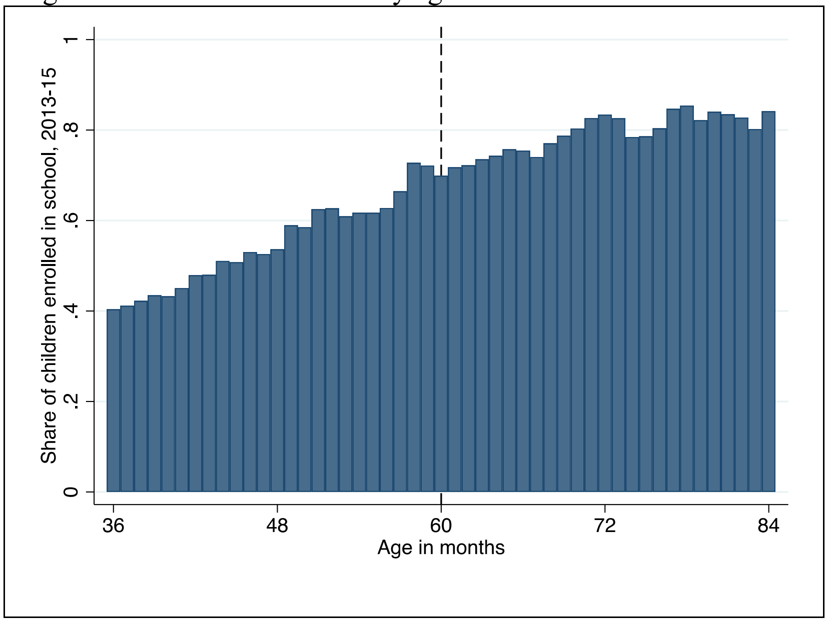
Notes: Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. Each cell presents the coefficient of interest ($\beta 2$) from estimating Equation (1) using the polynomial specification and bandwidth noted at the top of each column. Column 1 reproduces the main estimates, and the remaining columns display the specification robustness checks. Standard errors (in parentheses) are clustered by the day of exam/interview. Observations are weighted using the appropriate NHANES sampling weights (differs by outcome). The main bandwidth is 719 days and the estimates use a triangular kernel. Covariates include race, ethnicity, and whether the household reference person has less than a high school degree. Optimal bandwidth is 574 days (FI mod, child), 599 days (FI mod, adult), and 761 days (calories). * p<0.10, ** p<0.05, and *** p<0.01.

Figure A1: RD Estimates of Predicted Moderate Adult Food Insecurity



Notes: Each figure provides a visual representation of the estimation of the cubic specification of the running variable in equation (1) on predicted moderate adult food insecurity using demographic characteristics in NHANES: age; race and ethnicity; whether the household reference person has less than a high school degree; and whether the child is male. Each dot on the figure represents the weighted mean of the outcome variable listed in the title, for children in that 60 day bin, and the bars give the 95% confidence interval for the mean. Limited to families living at less than 200 percent of the FPL with one child between the ages of 3 and 7. The bandwidth is 719 days and the estimates use a triangular kernel.

Figure A2: School enrollment by age



Notes: Source: SIPP topical modules, panel 2014, spanning calendar years 2013-2025. Analysis limited to families below 200 percent of poverty with one child ages 3-7.