



When does it count? The timing of food stamp receipt and educational performance



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ABSTRACT

The effect of poor nutrition has been established as an important determinant of learning and achievement among school-age children. Further, it has been shown that households' receiving food stamps fail to smooth consumption over the benefit month and experience periods of meaningful nutritional deficiencies. This paper exploits detailed administrative data on standardized math tests scores and randomized food stamp receipt dates to allow us to measure the impact of these low nutritional periods on student performance. Our main results demonstrate that scores are notably lower when the exam falls near the end of the benefit cycle and when food stamps arrive on the 4 days immediately preceding the exam. While both male and female students experienced a similar penalty with receipt near the end of the cycle, the effect from receipt just prior to the exam appears to be partially explained by a large negative effect associated with weekend receipt, which coincides with the 4 days prior to the exam. Our results provide evidence that households do not sufficiently smooth consumption and that this has measurable effects on student performance.

1. Introduction and background

The Supplemental Nutrition Assistance Program (SNAP) provides assistance to over 40 million Americans and is the largest safety net program designed to alleviate hunger. Not surprisingly, there is a substantial literature on the effectiveness of the program on relieving food insecurity and providing an adequate diet (Daveney & Fraker, 1989; Daveney & Moffitt, 1991; Fraker, 1990; Gunderson & Ziliack, 2003; Schmidt, Shore-Sheppard, & Watson, 2015). However, there is a growing body of evidence that low-income households do not effectively smooth their consumption throughout the month and that the timing of benefit receipt affects consumption (Mastrobuoni & Weinberg, 2009; Shapiro, 2005; Wilde & Ranney, 2000).

Related, there is considerable research establishing a link between adequate nutrition and health outcomes.¹ Given this link, it is not surprising that food insecurity has been shown to have deleterious effects on learning (Glewwe, Jacoby, & King, 2001; Winicki & Jemison, 2003). Additionally, food insecurity has been shown to affect student performance in school along a variety of non-cognitive dimensions. In particular, food insecurity is associated with worse social skills (Jyoti, Frongillo, & Jones, 2005), school engagement (Ashiabi, 2005) and classroom behavior (Howard, 2011).

Together, these findings suggest that the timing of bouts of food insecurity created by the lack of consumption smoothing observed during the SNAP benefits cycle might be associated with reduced cognitive performance.

In this paper, we estimate the effect of food stamp timing on math test scores using individual-level administrative data from the state of South Carolina. These data include the universe of all students in South Carolina whose families receive food stamps, and allow us to match food stamp receipt date with test dates and subsequent performance measures. Further, we can track the same students over time, so we are able to investigate how different food stamp timing relative to exam dates impact the *same* student over time. Our main results indicate that student performance is negatively impacted when a student's household receives benefits a particularly large number of days before the exam. Further, estimates show there is a negative association with receipt of food stamps on the four days prior to the exam and exam scores, which seems partially attributable to receipt of benefits on weekends (which occur three and four days prior to the exams).

While the effect of the exam falling late in the benefit cycle is common across male and female students, the magnitude is much larger among African Americans. The effect associated with receipt in the 4 days prior to the exam is driven by African-American boys. Further,

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¹ Gunderson and Ziliak (2015) provide a survey of recent literature on this relationship.

within this group, weekend receipt seems to be the most prevalent factor. A random assignment falsification exercise shows that all of the results vanish when we randomize the SNAP benefits schedule to inaccurately reflect the actual treatment observed by students. Given the results in the peer effects literature on peer composition and performance, particularly for mathematics (for example, Boucher, Bramoullé, Djebbari, & Fortin, 2014), we also investigate how the share of a school's recipients that receive benefits on a weekend or have particularly long waits may impact student performance. While we find no statistically significant relationship between the share of the school's recipients that receive a treatment on individual performance, the coefficients are suggestive of possible spillovers.

It is worth mentioning, that while we measure the impact of receipt timing on performance on a single testing day, each recipient faces many such days throughout the year. If the effects we find are evidence that students face a diminished capacity to learn, as opposed to just affecting testing performance, then the cumulative effects throughout the year could be quite large.

Our results contribute to a number of literatures.² First, these findings add additional evidence on the relationship between safety net programs, nutrition, and testing.³ Much of the previous work has focused on how school initiated assistance affects student performance. In particular, school breakfast programs have been a source of numerous prior studies. Notably, Leos-Urbel, Schwartz, Weinstein, and Corcoran (2013) find that free school breakfast programs increase participation in school breakfast even among those that were previously eligible for free breakfast, but have little impact on test scores. While Frisvold (2015) finds a somewhat contradictory result that expansion of free breakfast programs does increase achievement. Recent work by Imberman and Kugler (2014) and Corcoran, Elbel, and Schwartz (2016) looks at school breakfast programs delivered in the classroom as opposed to the cafeteria.⁴ Perhaps most telling is the responses of schools to increased pressure to perform well on standardized tests. Figlio and Winicki (2005) find that in response to increased scrutiny on exam performance, that schools increase the caloric value of meals on exam days and that this leads to improvements in performance. This is important in the context of our results, in that schools might be actively working to reduce the impact of long test date intervals by providing free breakfast (through PTA organizations) or manipulating the school's menus. This might mute the effect of increases in the number of days since receipt on exams. Our results suggest that while this might be possible to some degree, there remains a negative effect associated with particularly long intervals between receipt and exam dates.

We also contribute to the literature that studies high-frequency consumption patterns. Under the permanent income hypothesis, households should be able to smooth their consumption in response to expected income receipt. Thus, the timing of anticipated income should not affect consumption or behavior. Nonetheless, there is substantial evidence that the timing of transfers (Stephens, 2003) and pay (Stephens, 2006) affects patterns of consumption. Further, numerous papers have found this phenomenon in food stamp recipients. Perhaps most notably, Shapiro (2005) documents a 10–15% decline in caloric consumption across the benefit cycle. Wilde and Ranney (2000) also

² This paper is closely related to a contemporaneous paper by Gassman-Pines and Bellows (2018), who look at the timing of food stamp receipt and test scores during 2012 in North Carolina. Using cross-sectional variation for identification, they find that student performance improves as receipt is further from the exam date until around three weeks prior to the exam and then declines. These findings are qualitatively similar to our results. However, we do not find the same relationship between days since receipt and the exam date if we employ a similar empirical approach.

³ See Meyerhoefer and Yang (2011) for a review of methods and mechanisms for evaluating the link between safety net programs and health.

⁴ See Hoyland, Dye, and Lawton (2009) for a review of the effect of breakfast on performance.

document a decrease in consumption as well as a dramatic change in expenditures. Declines in expenditure across the benefit cycle are also found in Wilde and Andrews (2005) and Hastings and Washington (2010). Both Shapiro (2005) and Mastrobuoni and Weinberg (2009) suggest that these results are most consistent with households that are extremely impatient. Recent work from Carvalho, Meier, and Wang (2016) bolster this with evidence that households exhibit more present bias in decision making just before payday.

Utilizing within-student variation, we show that students with particularly long intervals between exam date and benefit receipt perform worse. This provides evidence that households do not effectively smooth consumption. Further, by showing that this has an adverse impact on test scores, we demonstrate that the failure to smooth effectively can have important impacts on outcome measures of public interest.

These results also have important and implementable policy implications. First, given the further evidence that families have difficulty smoothing consumption, distributing benefits twice in a month as opposed to just a single day might improve welfare. Given that this lack of smoothing has implications for student performance, this might also suggest that it is in the public interest to do more to help families smooth consumption levels throughout the month. Second, in consideration of prior work that households purchase greater amounts of alcohol when benefits are distributed on a weekend and that weekend receipt corresponds to a greater number of drunk driving fatalities, the fact that this is also associated with lower test scores among students, suggests that the public health benefits of restricting benefit distribution to weekdays might be significant (Cotti, Gordanier, & Ozturk, 2016). Of course, this could have the deleterious effect of slightly increasing the length between benefit receipt dates in some households. Additionally, it may be the case that other public benefit programs, besides SNAP, may also have behavioral responses to receipt that warrant further study.

The paper is structured as follows: Section 2 describes the data, Section 3 presents the econometric specifications, Section 4 comprises our main results, Section 5 looks at the robustness of the results and extensions, and Section 6 discusses the results, possible mechanisms and concludes.

2. Data

The primary data for this analysis come from the South Carolina Department of Education, and comprises test score information for students in all of the elementary and middle schools during the years 2000–2012. Each year students in grades 3 through 8 were given a statewide mathematics assessment. While there are a number of exams taken by students, we focus on the math exam as it is commonly studied as a measure of student performance and we know the exact date the math test was taken in each year, which is important for our empirical approach.

From 2000 to 2008 students were given the Pre-Admission Content Test (PACT), while from 2009–2012 they were given the South Carolina Palmetto Assessment of State Standards (SC PASS) test. These data are then merged with an administrative database on food stamp recipients. The scores, for every student who is in a food stamp receiving household during the testing month of that year, were provided by the Department of Education. The date in the month that a SNAP household receives benefits was provided to us by the Department of Social Services.⁵ Thus, a student who is in a household that receives benefits across multiple years will show up in the data each year the household

⁵ We thank Sarah Crawford, Veronica Watson, and Mohammad Salaam of the South Carolina Revenue and Fiscal Affairs Office for matching the data and removing identifying information.

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