Below the tip of the iceberg: Examining early childhood participation in SNAP and TANF from birth to age six

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ABSTRACT

Previous research has shown that investments during the early childhood period are likely to have the highest social return. We use administrative data from Virginia to document participation in SNAP and TANF among children born between 2007- 2010 during their early childhood period, which we define here as birth to age six. We find that participation in SNAP is about four times greater than participation in TANF and that most children begin their connection with the social welfare system in their birth year. Children who participate earlier in life tend to stay connected over a longer portion of the early childhood period, although SNAP participation peaks around ages 3-4 while TANF peaks earlier, around ages 2-3. In terms of joint participation, most households on SNAP do not receive TANF and about 1 in 12 children on TANF do not receive SNAP. Finally, over the early childhood period, on average, just under 1 in 2 children in Virginia participated in SNAP or TANF but demography plays an important role in this process: The level of cumulative receipt is 1 in 4 among White children, 1 in 2 among Hispanic children but rises to 3 in 4 for Black children; cumulative receipt is also higher in nonmetropolitan counties than metropolitan counties. This study documents the reach of the existing social welfare system during the early childhood period, underlining the importance of race and space in 21st century America.

Introduction

A well-established research tradition links family income to child well-being over the life course (Corcoran 2001; Blau 1999; Dahl & Lochner 2005; Duncan & Brooks-Gunn 1997; Guo & Harris 2000; Mayer 1997; McLoyd 1998; Reardon 2011; Reardon & Portilla 2016; Smith, Brooks-Gunn, & Klebanov 1997). Evidence of an income effect seems to be strongest at the bottom of the income distribution (Akee, Copeland, Keeler, Angold, & Costello 2010; Duncan & Brooks-Gunn 1997; Smith et al. 1997). This suggests that the strength of this relationship is not constant across incomes and that there is a threshold effect. Additional evidence suggests that the effect of income varies over the life course with the strongest impact on the cognitive development of preschool age children (Duncan & Brooks-Gunn 1997; Duncan, Morris, & Rodrigues 2011; Duncan, Yeung, Brooks-Gunn, & Smith 1998; Duncan, Ziol-Guest, & Kalil 2010). Consequently, many now argue for public investments to be made during the early childhood period when child-related expenses, such as child care, are particularly high, and parental earnings are likely lower than earnings later in life; a family with young children is more likely to be poor than in other points of the life course.

However, what we know about program dynamics and characteristics of receipt for the Supplemental Nutrition Assistance Program (SNAP) and the Temporary Assistance for Needy Families Program (TANF) during the early childhood period is largely out of date and likely suffers from serious measurement error. Recent evidence suggests that SNAP participation is common among children. Currently, SNAP participation among children accounts for over 40% of total SNAP program participation (Cronquist & Lauffer 2019). Furthermore, according to Rank and Hirschl (2009), from 1969 to 1997, the most recent time period for which this analysis is available, half of all children resided in a household that participated in SNAP at some point

during their childhood. Far fewer children participate in TANF. Though similar estimates of lifetime receipt are unavailable in previous research, on average only 1.2 million families received monthly cash transfers through TANF in 2016 (Giannarelli 2019). This study offers an updated and in-depth picture of program participation in TANF and SNAP during the first six years of life, the point in childhood when public investments are thought to have the highest rate of return (Heckman 2006; Heckman et al. 2010).

We use administrative data from the Virginia Department of Social Services to provide child level (instead of case-head level) information regarding SNAP and TANF receipt over the birth to age six time-period for children born between 2007 and 2010 in the Commonwealth of Virginia. Specifically, we focus on the following research questions:

1. At what age and for how long do households with young children participate in SNAP and TANF? How does the age of program entry influence social program participation in early childhood? How does this vary by race and ethnicity? By metropolitan and nonmetropolitan county residence?
2. How often is participation in SNAP and TANF joint? What characteristics are associated with differential program participation bundles?
3. What is the cumulative level of program receipt over the first six years of life?

This study makes several unique contributions to the literature. First, it provides more accurate estimates of longitudinal program participation over early childhood than what exists in the current literature through its use of state administrative data (instead of longitudinal survey data). Second, it provides estimates of program participation that reflect both post 1996 Welfare Reform policy conditions and post 2008 Great Recession economic conditions up to just prior to the COVID-19 crisis. By focusing on the experience of children born between 2007 and 2011, our analysis provides a baseline for understanding how these programs may operate during the upcoming economic contraction. Finally, by looking at the most significant program bundle likely to be experienced by low-income children during the early childhood period (SNAP and

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TANF)[1], we provide a more holistic picture of the support received during early childhood than previous analyses that have focused on participation in a single program. In essence, this study documents the reach of the existing social welfare system during the early childhood period, underlining the importance of race and space in 21st century America.

Literature Review

Historically, the program most closely associated with cash support for low-income single parent households during the early childhood period is the Aid to Dependent Children Program (AFDC). However, due to concerns over substantial work disincentives (including a benefit reduction rate for work ranging from 67%-100%), patterns of long-term participation, and concerns about marriage disincentives, the Welfare Reform Act of 1996 replaced AFDC with the Temporary Assistance for Needy Families Program (TANF). Federal requirements for TANF imposed five-year lifetime limits on benefit receipt and work requirements. In addition, TANF provided states with a great deal of flexibility to determine program eligibility, benefits, and services offered (Bitler & Hoynes 2016). States also have the option to divert federal TANF dollars to other uses besides cash support. As a consequence, national caseloads fell from 13 million recipients in 1995 under AFDC to 2.25 million in FY 2018 under TANF.

While prior to the 1996 Welfare Reform Act, AFDC was the primary federal program associated with aiding poor children, post-Welfare Reform SNAP has overtaken TANF in terms of expenditures per capita (Moffitt 2013). Newman, Todd, and Ver Ploeg (2011) find that while the association between SNAP and TANF receipt is positive, the strength of this correlation has weakened over time. The gap between SNAP and TANF has accelerated in the post Great

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[1] While the cash support offered through the Earned Income Tax Credit may be larger, it is limited to employed parents and given that it is disbursed once a year, it supports families very differently than the monthly sources of support that are our focus here.

Recession era (Moffitt 2013). The United States Department of Agriculture (USDA) funds SNAP to supplement household food security for those who qualify by providing a near-cash supplement to purchase food products. In 2019, SNAP provided nutrition support to 34 million Americans, with a total federal cost of $53.7 billion (USDA 2020). While the basic rules for SNAP eligibility and benefit amounts are set by the federal government, states administer the program at the state or county level (e.g., application process, recertification period, payment schedule). As a consequence, there is substantial variation in SNAP policies across states. According to federal eligibility criteria, households must have a gross income below 130% of the federal poverty line (FPL) or be categorically eligible through participation in a specified program, such as TANF, in order to qualify for SNAP. In 2018, the USDA estimated that 84% of all eligible individuals participated in the program (Vigil 2019).

Generally, once eligibility for SNAP is established, SNAP benefits are made available to households one time each month through an electronic benefit transfer (EBT). The federal formula used to determine levels of SNAP benefits takes into account households' net income and size, and the cost of food (under the USDA's Thrifty Food Plan). It is designed so that households with fewer resources receive more benefits (Center for Budget and Policy Priorities 2019). SNAP benefits make up the difference between 30% of a household's net income and the cost of food according to the Thrifty Food Plan estimates for a household's size. Families with no net income receive the maximum benefit amount (the total cost of the Thrifty Food Plan for that household size). Of particular relevance for this study, according to analysis of nationally representative SNAP Quality Control data, an estimated 8.1 million children received food assistance through the SNAP program in 2017, representing 44% of all SNAP recipients nationally. Among children who received SNAP, about 29% were preschool aged or below

(Cronquist & Lauffer 2019). Furthermore, about 10% of SNAP households containing children also participated in TANF during the month of receipt (Cronquist & Lauffer 2019).

SNAP and TANF differ in several important ways. By explicit design, SNAP reaches many more low-income households in Virginia and across the nation than TANF, which is targeted primarily for single parent households with children and is time limited. TANF benefits are paid as cash while SNAP benefits can only be used on food items. In Virginia, the maximum benefit amount for SNAP is actually higher than that of TANF.[2]

In terms of program dynamics over childhood, according to Rank and Hirschl's (2009) estimates from the Panel Study of Income Dynamics, about half of children lived in households that report SNAP use between the ages of 1 and 20 from 1968 and 1997 and one-quarter of children received SNAP by age five. For Black children during this period, rates of SNAP participation over childhood were even higher—90% over the entire childhood period and 62% by age five. Similar estimates of program participation over childhood are not available for TANF but there is considerable reason to expect that receipt is much lower. SNAP is targeted at a much higher income distribution than is TANF: federal eligibility for SNAP is at 130% of the FPL (or higher in states that have broad based categorical eligibility), while TANF is typically thought to reach those below 50% of the FPL.

Additionally, TANF is explicitly time-limited and SNAP is not. Furthermore, TANF funds are provided as a block grant to the states, while SNAP is an entitlement program. Thus, an individual's income might imply eligibility for both programs, but they might receive only SNAP. Similarly, SNAP operates as an "automatic stabilizer" during recessions; SNAP expands

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[2] The maximum SNAP benefit for a family of three in 2019 was $509 per month; for TANF the monthly benefit amount ranged from $363-$442.

during economic downturns and contracts during periods of recovery even without active intervention by policymakers.

What is more, policymakers often take active measures to expand SNAP during recessions, but are slower to further expand TANF. During the Great Recession, the American Recovery and Reinvestment Act of 2009 (ARRA) increased SNAP benefits by $40 billion. In contrast, ARRA only provided an additional $5 billion in emergency funds for TANF. In the midst of the COVID-19 pandemic, policymakers again moved more quickly to expand SNAP compared to TANF. The Families First Coronavirus Response Act (FFCRA) expanded eligibility and increased SNAP benefits by giving the USDA authority to grant waivers to states to issue emergency supplements. In addition, FFCRA provided funding to create new emergency nutrition programs such as Pandemic EBT, which provides additional SNAP-like benefits to children who qualify for free or reduced price lunch in schools. Conversely, while the Coronavirus Aid, Relief and Economic Security Act (CARES Act) extended funding of TANF into the next fiscal year, benefit levels remained unchanged. As a result, the cumulative, longitudinal reach of SNAP during economic downturns, such as the Great Recession or during the COVID-19 crisis, may touch a very high share of households, while TANF is not designed to be as responsive to changing economic conditions.

This study makes an important contribution to the literature by documenting participation in SNAP and TANF over the early childhood period using state administrative data. What is currently known about social program participation over early childhood does not reflect current economic and policy conditions, and likely understates participation rates due to growing levels of self-reported false negatives in social programs such as SNAP (Meyer et al. 2015, 2018). This study documents how children interact with the two most generous programs in the social safety

net over the early childhood period, when they are likely to benefit most from the public investment. Finally, we explore how patterns of participation differ by axes of inequality such as race and county metropolitan status.

Background on Virginia

In 2016, 36% (216,696) of Virginia's young children lived in low-income families (below 200% of the FPL), half of whom lived with one or more parents who were employed full time. In terms of the Commonwealth's demographic composition and economy, Virginia can be considered roughly comparable to the national average. About half (53%) of Virginia's young children are white, with another 19% Black and 14% Hispanic (National Center for Children in Poverty, 2018). Virginia contains rural, suburban, and urban communities. Economically, the timing of Virginia's contractions and expansions have mirrored those in the rest of the country. As of December 2019, the state unemployment rate was below 3.0%.

In terms of state welfare policies, TANF served 32,677 individuals in 18,975 families in Virginia in June 2019, which is down from 184,000 prior to Welfare Reform in 1995 (Office of Family Assistance 2004). Program receipt is limited to 60 months, although most participation spells last for less than one year in total with most participants not cycling on and off the program (Irving & Loveless 2015; VDSS 2012). Receipt is contingent upon 30 hours of qualified work activity unless the parents have received a health-related exemption, are in their third trimester of pregnancy, or are caring for an infant under 12 months old. Recipients may receive a $100 child support pass-through as well as an additional $50 per month (for 12 months) transitional benefit after participation in the Virginia Initiative for Employment not Welfare (VIEW), the state job training program. Virginia is one of a handful of states that imposes a

family cap, meaning that the benefit size does not increase if the family size increases after 9 months of the date of first receipt. As such, TANF policies in Virginia are a combination of both more restrictive and more generous than the average state, with a clear orientation towards the "Work First" approach. Finally, the size of TANF benefits depends on Virginia clients' region of residence and the maximum benefit for a mother with two children ranged from $363 to $442 in 2019 (VDSS 2019).

In contrast to the limited reach of TANF in Virginia, in FY 2016, approximately 826,000 individuals living in 387,000 households received $1.17 billion in SNAP benefits (FNS 2017). The average per person SNAP benefit amount was approximately $117 per month, which is slightly below the national average of $125 per month (FNS 2017). However, when given the option, Virginia has chosen policies that tend to limit the accessibility and generosity of SNAP. For example, Virginia is one of only ten states that does not extend eligibility of SNAP to households with gross household incomes above 130% of the FPL based on categorical eligibility with other programs. It is also one of the few to impose a modified drug felony ban on benefits. Finally, it does not allow non-custodial parents paying child support to deduct the value of their child support payments from their gross income at the point of eligibility determination. Because of these policies, fewer households are eligible for SNAP benefits in Virginia than in comparable states and eligible households are less likely to participate (Cunnyngham 2019; FNS 2018).

In terms of state program rules governing joint participation in TANF and SNAP, Virginia is one of ten states nationally that administers both TANF and SNAP at the county level, which allows for some within state variation in how the programs operate on the ground. Virginia allows households to apply for SNAP and TANF jointly in some cases and uses

consistent indicators of household resources to determine eligibility for both programs. Furthermore, if a TANF household head fails to comply with work requirements, the entire household can lose SNAP benefits. Together, these policies likely result in Virginia serving a somewhat smaller TANF and SNAP population than in states with more generous state policies and suggest that our results may provide an underestimate of the reach of these programs in other states.

Data

We use administrative data from the Virginia Department of Social Services to document patterns in program participation in SNAP and TANF during the first 6 years of life. We observe the census of children born between 2007 and 2010 who participated in either social program. Our administrative data allows us to observe the year and county of program receipt as well as basic demographic information for the child (race and ethnicity, age, and sex) and for the household head (race and ethnicity, age, marital status, and education level) and household composition (number and ages of children present; number and ages of adults present). This allows us to create complete social program life histories for all residents of Virginia during our observation period; we focus on those in early childhood.

Using statewide administrative datasets to estimate social welfare participation over the early childhood period has several advantages over the survey data approach used to inform past estimates. First, it has been well-established that recipients of social programs, such as SNAP and TANF, often do not accurately respond to survey questions and falsely report non-participation (Meyer et al., 2015). Recent estimates indicate that as many as 1 in 2 SNAP recipients falsely report not receiving program benefits in the previous year when responding to

the Current Population Survey (Celhay et al. 2018; Meyer et al. 2018) with significant consequences for studies of poverty and social welfare receipt (Bollinger and David 1997; Meyer et al. 2018; Meyer and Mittag 2019). Second, the high level of misreporting found in cross-sectional estimates of social program participation is likely amplified in longitudinal survey data since data collection for current longitudinal panel datasets such as the Panel Study of Income Dynamics and the Early Childhood Longitudinal Study are now fielded every other year. Finally, levels of SNAP and TANF participation have shifted in opposite directions in the last twenty years, with TANF participation plummeting after the 1996 Welfare Reform Act and SNAP participation increasing dramatically after the Great Recession, rendering previous estimates of cumulative participation inaccurate guideposts for recent cohorts of children.

Methods

In order to document recent patterns of social program participation, we examine four birth cohorts of children in the Commonwealth of Virginia and use a life table technique to describe their participation dynamics and timing, offering breakdowns by race and ethnicity as well as metropolitan status of the county of receipt. Essentially, we observe program participation in TANF and SNAP for each year of life. For these analyses, we focus our lens on the early childhood period, from birth to age six. For each calendar year, we observe if the child received the program in that year and we can add these events together to calculate the cumulative proportion of years observed in each program.

One advantage of our administrative data approach to this question is that we have a large sample size. While Rank and Hirschl (2009) pooled data from the Panel Study of Income Dynamics across 30 years to be able to observe 10,000 five-year olds, we well exceed that

sample size with data from a single cohort. This allows us to achieve both greater precision with our estimates and greater external validity for current conditions in that our estimates are not a thirty-year average of participation in SNAP but reflect a much more tightly constrained and relevant time period. All children contribute up to six person-years to the life table entering at birth and leaving at age 6.

While we do not observe children who do not participate in SNAP or TANF, we know the size of the annual birth cohort from the National Center for Health Statistics, Division of Vital Statistics. We assume that the birth cohort is the relevant population size. Doing so requires making assumptions about the number of deaths, immigration, and emigration to/from the state. For simplicity, we assume that immigration to the state balances deaths and emigration. Given that childhood deaths are highest in the first year of life and that people tend to move less (and less far) during economic downturns (Stoll 2013), this likely biases our estimates of the proportion of children who receive SNAP or TANF downward.

Our analysis proceeds in three parts. First, we describe patterns of participation over early childhood for participants of SNAP and TANF, describing the differences in the timing and duration of participation and how these program dynamics differ by race and ethnicity of the child[3] and metropolitan county residence. Second, we document demographic characteristics associated with participation in SNAP alone, TANF alone and both SNAP and TANF to gain a fuller sense of whom the safety net serves. We do this by presenting both descriptive differences

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[3] We construct five mutually exclusive race and ethnicity categories: Hispanic, Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Other, and Missing Race. Individuals who are of Hispanic ethnicity are categorized as Hispanic regardless of their identified race. "Non-Hispanic Other Race" includes individuals who are Asian, Native American, Hawaiian, or are categorized as "other race" but are not Hispanic. Non-Hispanic biracial individuals are categorized as Non-Hispanic Black if they are partially black, and Non-Hispanic Other otherwise. Individuals who are not identified as Hispanic and for whom the administrative record has no recorded race, are categorized as "Missing."

between the demographic characteristics within the early childhood population across program "bundles" and then estimate multinomial regression models to further understand these patterns. Finally, we estimate the cumulative level of participation in both the SNAP and TANF programs over the first six years of life, before most children enter the public school system, for this post-Great Recession cohort of children.

Results

SNAP and TANF Participation during Early Childhood

We begin by examining the ages at which young children are in a SNAP or TANF household in Table 1. We observe that the number of children who first participate in social welfare decreases monotonically each year from birth to age 6 for both SNAP (shown in the top panel) and TANF (shown in the bottom panel). For participants in both programs, by far the largest number of children begin receiving social welfare in the year of their birth, as shown in the first row of each panel. This pattern is consistent with what we know about new births pushing female headed households into poverty (McKernan & Ratcliffe 2002). For SNAP, about half as many children receive their first benefits in the year of their first birthday relative to the number of new children receiving SNAP in the year of their birth. Even fewer children begin SNAP in the year they turn two (less than 25% of the number who begin in the year they are born). The number of new cases continues to fall from there; for example, the number of children beginning SNAP after their fifth birthday is approximately 1/9 that of the year of birth.

For TANF, the decline in children by age of first participation is much less dramatic than that observed for SNAP. The number of new entrances onto TANF for children turning two is about half the number who first participate in the year of birth (it takes only one year for the number of new SNAP participants to fall that precipitously). The number does not fall to 25% of

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the birth year count of new cases until the year children turn four (as compared to the year children turn two for SNAP).

Secondly, Table 1 also displays the age during early childhood in which children are mostly likely to participate in each social welfare program. For SNAP, participation peaks around ages 3-4 while the peak in TANF participation is a full year earlier around ages 2-3.[4] Additionally, while participation does decline in the year children turn six (the first year for which most students are enrolled in school the entire calendar year) and a point when social and political expectations for mothers to work increases, it does not drop off dramatically, perhaps due to the fact that about 8.5% of children in Virginia live in a school district that only offers half-day kindergarten (Kindergarten Instructional Time 2020). It also could result from case heads caring for other, younger children. Over half (56.7%) of 6 year olds who receive SNAP or TANF have a younger child in the household.

Finally, Table 1 also illustrates the reach of SNAP and TANF during the early childhood period. While SNAP is not designed as primarily an early childhood intervention to support young families, it reaches nearly three times more children than TANF under pre-Covid-19 economic and political conditions: For the 2007 to 2010 birth cohorts in Virginia, 202,052 unique children participated in SNAP between their year of birth and age six. TANF, the program traditionally associated with aiding households with young children, however, reached only 71,506 unique children. Furthermore, given the high number of children who began receiving SNAP in their year of birth, SNAP reached a particularly high number of postpartum mothers and infants, a population that is often not articulated as a specific target of the program. The high enrollment numbers for this group may well be due to joint participation in other

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[4] This is inconsistent with the belief that women use TANF as a replacement for family leave (Ybarra, 2013).

programs that target prenatal and postnatal participation of mothers and infants, such as Medicaid, CHIP, or the Special Supplemental Nutrition Program for Women, Infants and Children Program (WIC).

Table 2 presents the share of children persisting in SNAP and TANF at each age by age first on the program. For SNAP, two patterns are noteworthy. First, children who begin receiving SNAP earlier persist on SNAP longer. This relationship between age of first participation and persistence on SNAP can be observed by examining the diagonal in Table 2. For example, 93% of children who first receive SNAP in their birth year persist to the year they turn one, while only 85% of children who first receive SNAP in the year they turn three persist to the year they turn four. Similarly, among children who first receive SNAP in the year they turn one, 75% persist on SNAP two years later when turning three, but among children who first receive SNAP in the year they turn three, only 62% persist on SNAP two years later in the year they turn five. Thus, throughout early childhood, the age of first receipt of SNAP is strongly correlated with persistence in the program.

Second, a high share of children observed to participate in SNAP in the year they turn six (when most students are enrolled in school) received SNAP for many more years than just that one. This results from both higher numbers of first-time SNAP recipients at younger ages (as shown in Table 1) and greater persistence among children who enter earlier (as shown in Table 2). For example, about 64% of children who received SNAP in their birth year also receive SNAP in the year they turn six.[5] In contrast, among children who first receive SNAP in the year of their second birthday, only 50% also receive SNAP in the year they turn six. As a result, for six-year old children, school officials observe the tip of the iceberg of early childhood poverty

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[5] Importantly, we note that this figure includes both continuous program receipt and multiple sporadic spells.

and social welfare participation because many more years of SNAP participation are hidden from their view and not observed by school administrators and teachers when students enter school. As the last column of Table 2 shows, 45% of children on SNAP in the year they turn six first received SNAP in their year of birth; 21% first received SNAP in the year they turned 1; 9% first received SNAP in the year they turned 2; and about 6% received SNAP for the first time in each year between ages three and six.

The pattern of persistence looks very different for TANF, as expected since TANF participation is time-limited. First, base levels of persistence are generally much lower for TANF than for SNAP. For example, the share of children who persist on TANF after one year is 10-20 percentage points lower relative to that of SNAP at all ages of first receipt. However, children who first receive TANF at earlier ages are still more likely to persist relative to children who first receive TANF at older ages, despite time-limits. Of those on TANF in their year of birth, 1 in 3 also receive TANF benefits four years later in the year they turn four; of those who first receive TANF in the year they turn two, less than 1 in 5 receive TANF four years later at age six. It is noteworthy, however, that for TANF, the persistence observed in Table 2 is unlikely to reflect consistent participation and more likely to contain gaps between periods of receipt.

As a consequence, if one focuses on the participation histories of six-year-old children on TANF, 26% first received TANF in their birth year; 19% first received TANF in the year they turn one, 10% first received TANF in the year they turn two, and about 8% first receive TANF in the years that they turn age three or four. Despite the fact that TANF has strong incentives towards shorter periods of receipt, among all six year olds on TANF, only 14% went on TANF for the first time in the previous year, and 14% for the first time at age six.

Figure 1 presents the racial and ethnic composition (Black, Hispanic, White) of new entrants to SNAP and TANF, respectively, by age of first entrance. There are both differences between programs and across racial groups for age of first participation. For SNAP, nearly half of the caseload that enters in the birth year is comprised of Black children, the highest share of participants for this age among the racial groups. However, in the year children turn two, the proportion of Black new entrants to SNAP is closer to 30% of total new cases for that age and virtually indistinguishable from that of Hispanic children; instead, the greatest share of new entrants is composed of White children. In contrast, at all ages, new entrants to TANF are most frequently Black and least frequently Hispanic; White children fall in between the other two groups, although the gap between White and Black children nearly closes by age 3.

Figure 2 show the racial breakdown of the SNAP and TANF caseloads at each age, respectively. Given the relationship between persistence and the racial distribution of first entrance at birth, it is perhaps no surprise that Black children comprise the largest share of the caseload at each age, followed by White children and then Hispanics. However, Black children comprise a larger share of the TANF caseload than the SNAP caseload, while White and Hispanic children comprise a larger share of the SNAP caseload relative to the TANF caseload.

When we turn our lens to consider county metropolitan status, our results document very similar trends across county designations, despite the differences in demographic composition and the size of the TANF cash benefit available to residents of different counties. Similar breakdowns (as shown by race and ethnicity above) are shown in Figure A1 and Figure A2 in the appendix, but by county metropolitan/nonmetropolitan designation. Approximately 80% of children in SNAP and TANF households live in metropolitan counties with a slightly higher proportion coming from nonmetropolitan areas in the birth year. However, in 2018, 90.6% of

children less than one years old resided in metropolitan counties; children living in nonmetropolitan counties are over-represented in both TANF and SNAP.

Predictors of Participation in Different Program Bundles

SNAP and TANF are both substantial sources of social welfare support during the early childhood period, but the programs tend to reach different groups of children living in different types of households. Furthermore, while most would assume that all TANF recipients are also enrolled in SNAP, this is not the case in Virginia where about 9.3% of the entire TANF caseload does not participate in SNAP. For the early childhood period, however, between 4-5% of TANF cases do not receive SNAP except in the year of birth when 7.2% of TANF recipients do not receive SNAP.

We present demographic characteristics of young children (birth to six) who participate in each program bundle (TANF only, SNAP only, and TANF+SNAP) between 2007 and 2016 in Table 3. We find a higher share of children who receive SNAP only or TANF only are Hispanic and White compared to those who participate in both programs jointly. Conversely, a higher share of children who receive SNAP+TANF jointly are Black compared to those who participate in either program alone. A higher share of early childhood participants in TANF, either alone or with SNAP, reside in metropolitan counties than those who participate in SNAP only.

Furthermore, children who receive the three program bundles reside in households with case heads that look systematically different, as well. See Table 4. For example, among early childhood users of DSS programs, a higher share of younger case heads (under 30) and older case heads (over 50) receive TANF only compared to those households that receive SNAP (only or jointly with TANF). Additionally, case heads in SNAP only households have earned higher levels of education and are more likely to be currently married or previously married than

households that receive program bundles that include TANF. Thus, overall it would appear that SNAP only household are advantaged relative to their TANF only and TANF+SNAP counterparts.

In order to control for the covariation between child and household characteristics and their association with program participation bundle, we use multinomial logistic regression models with joint participation in SNAP+TANF as the base outcome. We report all estimates at the "Average Marginal Effect" (AME) as displayed in Table 5. After controlling for both child and household head characteristics, relative to White children, Black children are 0.1 percentage points more likely to be on TANF only and 4.6 percentage points less likely to be on SNAP only than on both together. In contrast, Hispanic children are 4.2 percentage points more likely to be on SNAP only and 2.6 percentage points less likely to be on TANF alone. In terms of the metropolitan status of the county of residence, relative to children in nonmetropolitan counties, children in metropolitan counties are less likely to participate in SNAP alone (1.5pp) and no more likely to participate in TANF alone (AME=0.1 pp, but statistically insignificant) relative to both programs. Characteristics of program participation bundles vary in a nonlinear manner with respect to age: relative to children six years of age, children in their birth year are 1.7 percentage points more likely to be on SNAP only and 0.2 percentage points more likely to be on TANF only compared to SNAP+TANF. However, this relationship reverses for children after their first year through age five, when they are less likely to be on either program alone relative to both programs together.

In terms of the characteristics of the case heads, we observe that – relative to children with case heads under age 30 – those with case heads in the 30s and 40s are more likely to receive SNAP alone than SNAP+TANF, but this reverses for those with case heads 50 or older.

The opposite is true for the relationship between the age of the case head and receipt of TANF only. Relative to children with case heads under age 30, those with case heads over 50 are more likely to receive TANF only and less likely to receive SNAP only compared to SNAP and TANF together. Relative to children with case heads with a high school diploma or GED, children with household heads who have less education are 4.0 percentage points less likely to be on SNAP only and no more likely to be on TANF only (insignificant AME is 0.2 pp) relative to both programs jointly. The opposite is true when comparing children living with case heads with any college education to those with case heads with a high school or GED diploma, but the AMEs are quite small (0.4 for SNAP alone and -0.1 for TANF alone).

When we look at family formation, we observe that relative to case heads that have never been married, those currently married are 8.8 percentage points more likely to be on SNAP alone and 0.4 percentage points less likely to be on TANF alone than both programs together. For case heads who are divorced, widowed, or separated, we observe the relationship goes in the same direction but is smaller (1.8pp for SNAP alone and -0.2pp for TANF alone).

Interestingly, we observe that 10% of children in our sample are on cases that do not have an adult head listed in the administrative data and are what the literature refers to as "child only" cases. Relative to cases with case head information, child only cases are 14.0 percentage points more likely to receive SNAP alone and 4.6 percentage points more likely to receive TANF alone than SNAP+TANF.

Cumulative Participation Over Early Childhood

Finally, for each of the four cohorts of children who we observe from birth to age six, we document how many unique children participate in SNAP or TANF over this time period. See

Table 6. For each cohort, we observe just under 50,000 unique children in SNAP, TANF, or both programs within the first six years of life. Only about 31,000-35,000 children are participating in SNAP or TANF in the year that they are eligible to begin kindergarten. This suggests that for about 15,000-20,000 children in Virginia each year, their economic position has improved by the time they enter kindergarten. Thus, for those children, earlier social welfare participation is not observed when schools check for school lunch program eligibility.

Given that between 103,000-109,000 live births occurred each year during our study period (the later years have the lower levels of births as fertility dropped during the Great Recession as documented by Hamilton, et al. [2020]), we can estimate the proportion of all children born in Virginia who ended up receiving SNAP or TANF in the first six years of life. When we do the same life table calculation as done by Rank and Hirschel (2009) for SNAP, we find that between 45.0 and 46.7% of children participated in SNAP or TANF in the first six years of life in Virginia. This estimate is considerably larger than the Rank and Hirschel estimate of 25% for early childhood. The higher estimate is likely the result of more accurate reporting of program participation as well as high overall levels of participation during the Great Recession, including policy conditions designed to increase participation. In addition, the Rank and Hirschel estimate is for SNAP alone but our estimate includes TANF participation, as well. However, as Table 6 illustrates, most children live in households that receive program bundles that include SNAP and only a small fraction receive TANF alone. If we remove the TANF only households from our calculation, we still estimate within-cohort cumulative levels of participation of SNAP between 44.7% and 46.6%.

A much higher share of children participate in TANF and SNAP at some point in early childhood than the share who participate specifically when they enroll in kindergarten. In column

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8, we show that about 1 in 3 children receive SNAP or TANF in their kindergarten year. When schools use observed participation in social programs in the year of school entry as an indicator of economic well-being, they miss a significant portion of the disadvantage that children have experienced over the early childhood period.

Table 6 also presents cohort estimates of cumulative receipt of SNAP and TANF by age six for the three largest racial and ethnic groups (Hispanics, Whites and Blacks). Racial estimates are once again in line with those documented by Rank and Hirschel (2009) but are substantially greater, consistent with our finding for all children. About half of all Hispanic children in Virginia are observed receiving SNAP or TANF in early childhood (birth to age six). Perhaps surprisingly, Hispanic children born in cohorts after the Great Recession (2010, for example), when economic conditions were improving, participate at higher rates than those before (2007, for example); in part, this seems to relate to substantial decreases in the number of births for Hispanic mothers in the aftermath of the economic downturn (others have documented the particularly high fall in fertility rates among Hispanic mothers throughout the Great Recession; for example, see Livingston 2019). For Black children, the share of children who participate at some point in early childhood is much higher than Hispanic children, as high as 77.6% for children born prior to the Great Recession (2007), and as low as 71.6% for children born in 2010, after the Great Recession. In stark contrast, levels of receipt for White children is much lower, ranging from 23.3% to 26.0%, and also is lower for the cohorts of children born after the Great Recession who spent more of their early childhood in stronger economic conditions.

Finally, we present the same set of cumulative receipt estimates for TANF and SNAP by metropolitan county status in Table 7 (assigning children to the counties in which we first observe them). Children in metropolitan counties have much lower cumulative levels of social

welfare receipt over the early childhood period than do children in nonmetropolitan counties. Specifically, we document that 41.8 to 43.6% of children in metropolitan counties receive SNAP and TANF in the first six years of life compared to 67.9 to 71.8% of children in nonmetropolitan counties.[6]

Discussion

We use administrative data from a large and diverse state to document verified program participation in SNAP and TANF during the early childhood period, which we define here as birth to age six, when all children in Virginia are eligible to be enrolled in the public school system. Previous research has shown that investments during the early childhood period are likely to have the highest social return. We chose to focus on SNAP and TANF program participation because they are the most significant sources of direct support available to families with young children.

Our study documents the program participation coverage of SNAP and TANF in one southeastern state with a highly diverse population that nearly mirrors that of the US in terms of racial composition. Additionally, 1 in 7 of the Commonwealth's residents live in a nonmetropolitan county, which adds further diversity to our study population. Our administrative data capture all children born between 2007-2010 in Virginia who receive TANF or SNAP between birth to age six. Thus, we document patterns in program participation that reflected

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[6] As a sensitivity check, we calculated the cumulative receipt for those only observed in metropolitan counties and those only in nonmetropolitan counties; by construction these are lower bound estimates because the number of live births is the same, but we only include those who receive their benefits exclusively in the county. (See Appendix Table A2.) Similar results emerge, though – mechanically -- we observe slightly lower participation rates when including children who only live in nonmetropolitan counties than we did when we retain those who move (ranging from 60.9 to 64.4%).

economic and policy conditions leading up to and after the Great Recession, but prior to the COVID-19 crisis. As such, this study represents an important update to previous research that focused on patterns of program participation that occurred prior to the 1996 Welfare Reform Act and the Great Recession. To the extent that Virginia's SNAP and TANF policies are somewhat more conservative than the national average and restrict access and eligibility in ways that other states do not, our results here represent an under-estimate of the program's nationwide reach over the early childhood period. Yet, our estimates are much greater than those from previous research that relies on survey responses.

We find that during the early childhood period, participation in SNAP is about four times greater than that of TANF and that most children begin their connection with the social welfare system in their birth year. Children who participate earlier in life tend to stay connected over a longer portion of the early childhood period, although SNAP participation peaks around ages 3-4 while TANF peaks earlier, around ages 2-3. In terms of joint participation, most households on SNAP do not receive TANF and about 1 in 12 children on TANF do not receive SNAP. Finally, over the early childhood period, on average, just under 1 in 2 children in Virginia participated in SNAP or TANF but demography plays an important role in this process: The level of cumulative receipt is only 1 in 4 among White children, 1 in 2 among Hispanic children but rises to 3 in 4 for Black children; cumulative receipt is also higher in nonmetropolitan counties than in metropolitan counties. We discuss implications of these findings for both research and policy below.

Implications for Research

While it has long been known that the risk of poverty was highest at birth and then declines throughout the life course, most research lacks the ability to incorporate this knowledge directly into the study. We are often forced to take the first observation in a longitudinal file as a good, albeit noisy, indicator of whatever is left censored. Our study suggests that we are often only able to observe the tip of the iceberg and that much longer periods of program participation and economic disadvantage precede that which is observed at school entry.

Another implication of our findings shown in Table 6 is that previous estimates of childhood exposure to food insecurity (Rank and Hirschl 2009) provided a gross under-estimate of the true reach of the SNAP program. While they estimate that 1 in 4 children received food assistance during early childhood, our estimates are much closer to 1 in 2 on average, with racial breakdowns rising to 3 in 4 among Black children and 2 in 3 among children in nonmetropolitan counties. While some portion of the higher level of program receipt that we observe is the result of changing economic and policy conditions, some portion is likely due to under-reporting in survey data for indicators of participation in means-tested programs. Administrative data is well designed to answer research questions about longitudinal program participation, and we encourage future researchers to utilize such data sources for these questions.

Finally, previous research has the unfortunate habit of exploring program participation program by program instead of exploring participation in different program bundles, which is how most households experience social welfare programs. While it is no doubt easier to isolate the patterns associated with specific programs, we believe that we have shown that it is useful and not so difficult to describe participation patterns across program bundles. Once again, administrative data is particularly well-suited to answer these types of questions since one can put aside worries about compounding measurement error across multiple programs.

Implications for Policy

Unlike many other developed countries, the United States has no traditionally defined package of family policies to provide a social safety net that specifically targets parents to buffer the extra costs associated with a new birth, such as providing a monthly child allowance or paid family leave (Kamerman & Kahn 2001). As such, American family policy remains ill-defined. Scholars debate whether family policy should solely refer to programs that are explicitly designed to target families or be defined more broadly to encompass any policies which affect families (Berger & Carlson 2020). We support the comprehensive conceptualization of family policy. Given the reach of SNAP and TANF -- with almost 1 in 2 children receiving benefits from these programs at some point before finishing kindergarten – these programs could well be considered the backbone of U.S. family policy. Most children who receive SNAP or TANF in early childhood begin receipt in the birth year, suggesting these programs are utilized by low-income households to meet essential expenses around the birth of a child. Absent traditional family policy programs, American parents appear to use SNAP, and to some extent TANF, for this same purpose.

There is a lengthy literature that already shows that food insecurity during the early childhood period is associated with negative cognitive, behavioral and health outcomes (Alaimo et al. 2002; Bhattacharya, Currie, & Haider 2004; Bronte-Tinkew et al. 2007; Cook & Frank 2008; Cook et al. 2013; Duncan, Brooks-Gunn & Klebanov 1994; Hernandez & Jacknowitz 2009; Howard 2011; Jyoti et al. 2005; Morgane et al. 1993; Pollit 1994; Ryu & Bartfield 2012; Scholl & Johnson 2000; Whitaker et al., 2006) and that SNAP participation reduces food insecurity (Ettinger de Cuba et al. 2019 ; Hoynes & Ziliak 2018; Nord and Golla 2009; Ratcliffe & McKernan 2010). Given this previous research, SNAP participation during early childhood is

desirable. Consequently, the high levels of program coverage observed should not provoke any cause for concern and should be considered as a potential reason to avoid reducing access to SNAP. These results are timely, because prior to the COVID-19 crises, the Trump administration issued a regulation to roll back broad-based categorical eligibility for SNAP which would restrict participation for households with children to those with annual gross household incomes below 130 percent of the FPL. While households with children are not the sole target group of SNAP, our study suggests that the program is a major source of support during a vulnerable part of childhood when social investments have their greatest returns. Going forward, cuts in eligibility for SNAP are likely to affect a very large share of families during their children's early years.

Finally, this study confirms what many others, notably Edin and Shaefer (2015), have found: TANF, which may be the only source of cash support for female headed households that are not stably attached to the labor market, is no longer a significant source of support for households with young children. In Virginia, the maximum SNAP benefit for a parent with two children is larger than the cash benefit from TANF and is not time-limited (while TANF is). Perhaps as a consequence, TANF caseloads are one-quarter the size of SNAP caseloads and most households with young children who receive SNAP do not receive TANF, even in their birth year.

Thus, as the role of TANF grows smaller and smaller as a means of supporting households with young children, the role of SNAP grows larger. This might be somewhat limiting for low income households. While SNAP is a near-cash supplement, it can only be used on food, so SNAP households with young children may have essential needs that remain unmet (such as diapers, hygiene products, bus fare, utilities, rent, etc.) without additional cash inflows. TANF, on the other hand, is a cash transfer, which allows families to use resources on any of

their priorities, but TANF is increasingly unused by or unavailable to low income families with young children.

Nonetheless, given the evidence regarding the ability of SNAP benefits to reduce childhood food insecurity and protect child health, as well as the existing program's reach, SNAP is going to be a critical source of support for many households in America with young children as they weather the public health and economic consequences associated with the COVID-19 pandemic. It is important to document the existing reach of this program, particularly for those living in rural areas and for nonwhite children. The United States has such few federal programs that broadly reach households with young children and provide direct support in a meaningful way; we must work to strengthen those that we do have.[7] As a consequence of the COVID-19 crisis, many more children will participate in SNAP and TANF, perhaps at historically high rates. It is important that policymakers, educators, and researchers bear in mind that the economic disadvantages schools observe in the year of school entry may well be just the tip of the iceberg of the economic disadvantage children have faced since birth.

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[7] Please see Hardy, Hill and Romich (2019) for a discussion of one approach.

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Table 1. Age First Participated in SNAP and TANF (2007-2010 Birth Cohorts)

Panel A: SNAP		# Participating by Age						
		0	1	2	3	4	5	6
Age First Participated	0	88,234	82,087	72,816	68,824	65,311	61,852	56,608
	1		46,162	40,773	34,771	31,864	29,650	26,740
	2			21,821	18,959	14,522	12,654	10,908
	3				15,728	13,366	9,813	7,988
	4					12,371	10,227	7,008
	5						10,663	8,582
	6							7,073
	Total	88,234	128,249	135,410	138,282	137,434	134,859	124,907
Panel B: TANF		# Participating by Age						
		0	1	2	3	4	5	6
Age First Participated	0	22,791	18,980	13,233	10,319	7,263	5,981	5,030
	1		17,929	13,159	9,009	6,131	4,436	3,697
	2			10,769	7,629	4,797	2,911	1,960
	3				7,361	5,035	2,986	1,616
	4					5,421	3,506	1,864
	5						4,466	2,723
	6							2,769
	Total	22,791	36,909	37,161	34,318	28,647	24,286	19,659

Note: Authors' tabulations based on Department of Social Service Administrative Data from Virginia

Table 2. Share in SNAP and TANF (2007-2010 Birth Cohorts)

Panel A: SNAP	Share Participating by Age/Age First Participated								Share of 6 Year Old Participants By Age of 1st Receipt
		0	1	2	3	4	5	6	
Age First Participated	0	100%	93%	83%	78%	74%	70%	64%	45%
	1		100%	88%	75%	69%	64%	58%	21%
	2			100%	87%	67%	58%	50%	9%
	3				100%	85%	62%	51%	6%
	4					100%	83%	57%	6%
	5						100%	80%	7%
	6							100%	6%
Panel B: TANF	Share Participating by Age/Age First Participated								Share of 6 Year Old Participants By Age of 1st Receipt
		0	1	2	3	4	5	6	
Age First Participated	0	100%	83%	58%	45%	32%	26%	22%	26%
	1		100%	73%	50%	34%	25%	21%	19%
	2			100%	71%	45%	27%	18%	10%
	3				100%	68%	41%	22%	8%
	4					100%	65%	34%	9%
	5						100%	61%	14%
	6							100%	14%

Note: Authors' tabulations based on Department of Social Service Administrative Data from Virginia

Table 3. Comparison Table for Children 0-6 on DSS

	SNAP Only	SNAPTANF	TANF Only
	(1)	(2)	(3)
Hispanic	0.130***	0.071	0.111***
	(0.337)	(0.256)	(0.326)
Black	0.363***	0.554	0.464***
	(0.481)	(0.497)	(0.499)
White	0.320***	0.267	0.318***
	(0.467)	(0.443)	(0.462)
Other	0.058***	0.034	0.020***
	(0.232)	(0.179)	(0.139)
Missing Race	0.129***	0.074	0.087***
	(0.335)	(0.262)	(0.280)
Female	0.492***	0.495	0.495
	(0.500)	(0.500)	(0.500)
Metropolitan	0.807***	0.823	0.851***
	(0.395)	(0.382)	(0.356)
0	0.097***	0.086	0.153***
	(0.296)	(0.280)	(0.360)
1	0.145***	0.163	0.130***
	(0.352)	(0.369)	(0.336)
2	0.151***	0.171	0.135***
	(0.358)	(0.377)	(0.342)
3	0.152***	0.167	0.139***
	(0.359)	(0.373)	(0.346)
4	0.153***	0.151	0.144***
	(0.360)	(0.358)	(0.351)
5	0.153***	0.136	0.148***
	(0.360)	(0.343)	(0.355)
6	0.150***	0.127	0.152***
	(0.357)	(0.333)	(0.359)
Observations	1,555,503	418,751	23,127

Note: All race and ethnicity categories are mutually exclusive. All race categories denote Non-Hispanic individuals. Stars indicate the result is statistically significantly different from joint participation in SNAP and TANF. * Statistically significant at the 5 percent level; ** at the 1 percent level; *** at the 0.1 percent level.

Table 4. Comparison Table for Household Heads of 0-6 Children on DSS

	SNAP Only	SNAPTANF	TANF Only
	(1)	(2)	(3)
Hispanic	0.053***	0.071	0.111
	(0.223)	(0.183)	(0.178)
Black	0.413***	0.568	0.266***
	(0.492)	(0.495)	(0.442)
White	0.418***	0.322	0.157***
	(0.493)	(0.467)	(0.364)
Other	0.036***	0.022	0.013***
	(0.185)	(0.146)	(0.112)
Missing Race	0.080***	0.054	0.532***
	(0.272)	(0.225)	(0.499)
Female	0.886***	0.903	0.910**
	(0.318)	(0.297)	(0.286)
18-29	0.566***	0.673	0.708***
	(0.496)	(0.469)	(0.455)
30-39	0.331***	0.227	0.138***
	(0.471)	(0.419)	(0.345)
40-49	0.081***	0.067	0.079***
	(0.273)	(0.250)	(0.270)
50-59	0.016***	0.024	0.052***
	(0.125)	(0.152)	(0.223)
60+	0.004***	0.007	0.019***
	(0.065)	(0.086)	(0.137)
Less Than High School	0.199***	0.233	0.232
	(0.399)	(0.423)	(0.422)
HS Grad or GED	0.580***	0.572	0.588***
	(0.494)	(0.495)	(0.492)
Any College	0.221***	0.194	0.180***
	(0.415)	(0.396)	(0.384)
Never Married	0.544***	0.671	0.686***
	(0.498)	(0.470)	(0.464)
Married	0.250***	0.144	0.135***
	(0.433)	(0.351)	(0.342)
Divorced/Widowed	0.206***	0.185	0.179*
	(0.404)	(0.388)	(0.384)
Metropolitan	0.793***	0.819	0.850***
	(0.406)	(0.385)	(0.357)
Observations	1,380,761	401,912	15,717

Note: All race and ethnicity categories are mutually exclusive. All race categories denote Non-Hispanic individuals. Stars indicate a statistically significant difference from those who jointly participate in SNAP and TANF. * Statistically significant at the 5 percent level; ** at the 1 percent level; *** at the 0.1 percent level.

Table 5. Multinomial logistic regression model results

	SNAP Only	TANF Only
	Base Outcome: SNAP and TANF Participation	
	AME	AME
Race/ethnicity of child (Reference: non-Hispanic White)		
Hispanic	0.042***	-0.026***
Black	-0.046***	0.001***
Other Race	0.03***	-0.035***
Missing Race	0.053***	-0.024***
Age of child (Reference: 6)		
0	0.017***	0.002***
1	-0.03***	-0.005***
2	-0.035***	-0.004***
3	-0.032***	-0.003***
4	-0.017***	-0.002***
5	-0.004***	-0.001***
Female child	-0.001*	0.000***
Metropolitan	-0.015***	0.001***
Children in household	0.006***	-0.006***
Race/ethnicity of household head (Reference: non-Hispanic White)		
Hispanic	-0.002	0.021***
Black	-0.036***	0.002***
Other Race	0.014***	0.018***
Missing Race	-0.036***	0.04***
Age of household head (Reference: 18-29)		
30-39	0.068***	-0.007***
40-49	0.031***	-0.001*
50-59	-0.065***	0.007***
60 Plus	-0.083***	0.007***
Educational attainment of household head (Reference: high school/GED)		
Less than High School	-0.04***	0.002***
Any Higher Edu	0.004***	-0.001***
Marital status of household head (Reference: never married)		
Married	0.088***	-0.004***
Separated, Divorced, Widowed	0.018***	-0.002***
Female head of household	0.023***	0.006***
No household head	0.14***	0.046***
Observations	1,997,381	
Pseudo R^2	0.0838	
Log likelihood	-1050181.5	

Note: The model includes year fixed effects. All race and ethnicity categories are mutually exclusive. All race categories denote Non-Hispanic individuals. * Statistically significant at the 5 percent level; ** at the 1 percent level; *** at the 0.1 percent level.

Table 6. Cohort estimates of Cumulative Receipt of TANF and SNAP by Age 6 by Race

	# of Children who before the Age of 6 were at One Point on DSS			Unique Children	On SNAP or TANF in YOB+5	Cohort Size (Live Births by Year)[a]	Percent of Cohort on DSS before the Age of 6 (4)/(6)	Percent of Cohort on DSS in the Year of their 5th Birthday (5)/(6)
	SNAP Only	TANF Only	SNAP/TANF					
Panel A: All Children	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Cohort 1, Born 2007	44,571	1,465	17,916	48,868	35,638	108,738	44.94%	32.77%
Cohort 2, Born 2008	45,942	1,426	17,563	49,890	35,302	106,536	46.83%	33.14%
Cohort 3, Born 2009	45,188	1,329	16,825	49,030	33,568	104,832	46.77%	32.02%
Cohort 4, Born 2010	44,558	1,126	15,005	48,046	31,554	102,936	46.68%	30.65%
Panel B: Hispanic								
Cohort 1, Born 2007	6,874	130	1,712	7,399	5,387	14,967	49.44%	35.99%
Cohort 2, Born 2008	6,863	143	1,652	7,323	5,141	14,273	51.31%	36.02%
Cohort 3, Born 2009	6,665	126	1,562	7,064	4,643	13,688	51.61%	33.92%
Cohort 4, Born 2010	6,363	131	1,277	6,739	4,205	12,506	53.89%	33.62%
Panel C: Black								
Cohort 1, Born 2007	16,546	745	9,200	18,426	14,580	23,763	77.54%	61.36%
Cohort 2, Born 2008	16,438	696	8,936	18,123	14,101	23,270	77.88%	60.60%
Cohort 3, Born 2009	15,855	632	8,367	17,406	13,345	23,019	75.62%	57.97%
Cohort 4, Born 2010	14,709	501	7,308	16,002	12,044	22,366	71.55%	53.85%
Panel D: White								
Cohort 1, Born 2007	14,586	464	5,300	15,635	11,414	62,264	25.11%	18.33%
Cohort 2, Born 2008	15,010	451	5,119	15,976	11,208	61,454	26.00%	18.24%
Cohort 3, Born 2009	14,115	400	4,745	14,992	10,136	60,405	24.82%	16.78%
Cohort 4, Born 2010	13,307	338	4,090	14,039	9,016	60,375	23.25%	14.93%

[a]Source: National Center for Health Statistics, Division of Vital Statistics. (2019). Natality public-use data 2007-2018. Retrieved from http://wonder.cdc.gov/natality-current.html.

Table 7. Cohort estimates of Cumulative Receipt of TANF and SNAP by Age 6 by Metropolitan Residence Status of First Observation

	# of Children who before the Age of 6 were at One Point on DSS			Unique Children	On SNAP or TANF in YOB+5	Cohort Size (Live Births by Year)[a]	Percent of Cohort on DSS before the Age of 6 (4)/(6)	Percent of Cohort on DSS in the Year of their 5th Birthday (5)/(6)
	SNAP Only	TANF Only	SNAP/TANF					
Panel A: All Children	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cohort 1, Born 2007	44,571	1,465	17,916	48,868	35,638	108,738	44.94%	32.77%
Cohort 2, Born 2008	45,942	1,426	17,563	49,890	35,302	106,536	46.83%	33.14%
Cohort 3, Born 2009	45,188	1,329	16,825	49,030	33,568	104,832	46.77%	32.02%
Cohort 4, Born 2010	44,558	1,126	15,005	48,046	31,554	102,936	46.68%	30.65%
Panel B: Metropolitan Counties								
Cohort 1, Born 2007	36,521	1,269	14,804	40,183	29,263	96,094	41.82%	30.45%
Cohort 2, Born 2008	37,637	1,204	14,447	40,957	28,844	94,240	43.46%	30.61%
Cohort 3, Born 2009	37,311	1,148	13,969	40,608	27,565	93,310	43.52%	29.54%
Cohort 4, Born 2010	36,832	955	12,443	39,844	26,002	91,476	43.56%	28.42%
Panel C: Nonmetropolitan Counties								
Cohort 1, Born 2007	8,050	196	3,112	8,685	6,375	12,790	67.90%	49.84%
Cohort 2, Born 2008	8,305	222	3,116	8,933	6,458	12,446	71.77%	51.89%
Cohort 3, Born 2009	7,877	181	2,856	8,422	6,003	11,749	71.68%	51.09%
Cohort 4, Born 2010	7,726	171	2,562	8,202	5,552	11,526	71.16%	48.17%

[a]Source: National Center for Health Statistics, Division of Vital Statistics. (2019). Natality public-use data 2007-2018. Retrieved from http://wonder.cdc.gov/natality-current.html.

Figure 1. Age First on Program by Race and Ethnicity

Panel A: Age First on SNAP
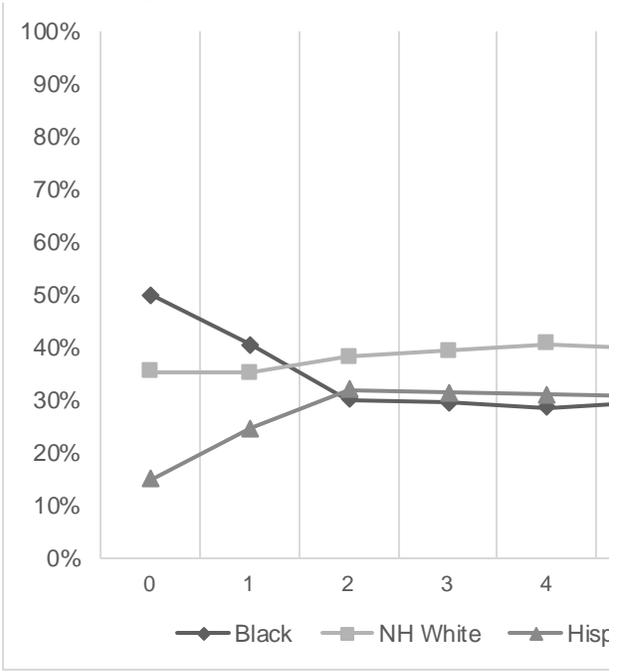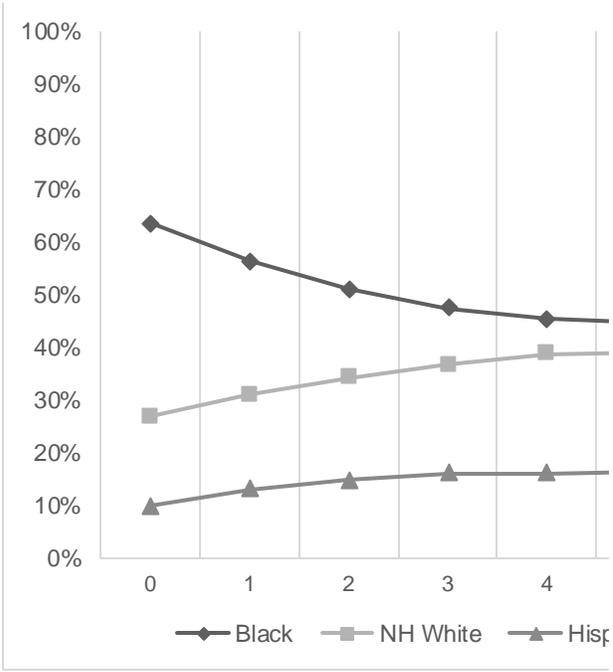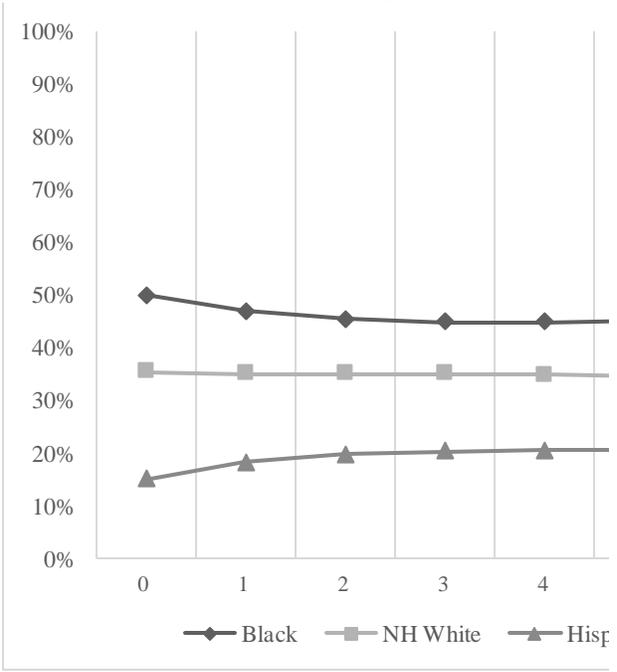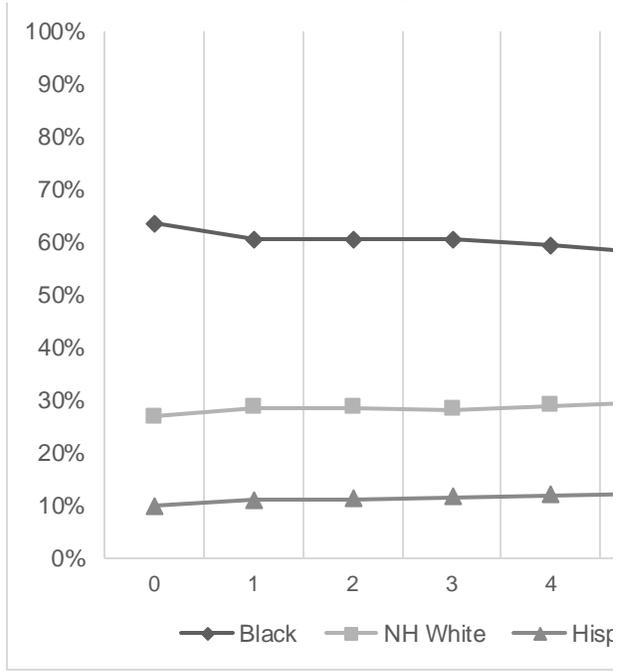

Panel B: Age First on TANF

Figure 2. On Program at Each Age by Race and Ethnicity

Panel A: On SNAP at Each Age

Panel B: On TANF At Each Age

Appendix

Table A1. Full multinomial logistic regression model results, log odds coefficients and standard errors

	SNAP Only		TANF Only	
	Base Outcome: SNAP and TANF Participation			
	Coef.	(SE)	Coef.	(SE)
Intercept	1.012***	0.012	-2.564***	0.052
Race/ethnicity of child (Reference: non-Hispanic White)				
Hispanic	0.136***	0.010	-2.537***	0.029
Black	-0.289***	0.008	-0.142***	0.022
Other Race	0.02	0.013	-3.506***	0.052
Missing Race	0.221***	0.009	-2.253***	0.030
Age of child (Reference: 6)				
0	0.116***	0.008	0.264***	0.028
1	-0.219***	0.007	-0.643***	0.028
2	-0.245***	0.007	-0.599***	0.027
3	-0.22***	0.007	-0.484***	0.027
4	-0.119***	0.007	-0.303***	0.027
5	-0.033***	0.007	-0.126***	0.027
Female child	-0.008*	0.004	-0.001	0.015
Metropolitan	-0.092***	0.005	0.018	0.021
Children in household	0.013***	0.002	-0.572***	0.009
Race/ethnicity of household head (Reference: non-Hispanic White)				
Hispanic	0.091***	0.012	2.162***	0.051
Black	-0.223***	0.008	0.04	0.032
Other Race	0.183***	0.015	1.952***	0.077
Missing Race	-0.026	0.01	4.085***	0.028
Age of household head (Reference: 18-29)				
30-39	0.406***	0.005	-0.343***	0.026
40-49	0.198***	0.008	0.086	0.035
50-59	-0.381***	0.013	0.413***	0.045
60 Plus	-0.495***	0.023	0.334***	0.072
Educational attainment of household head (Reference: high school/GED)				
Less than High School	-0.25***	0.005	-0.029	0.021
Any Higher Edu	0.017***	0.005	-0.135***	0.023
Marital status of household head (Reference: never married)				
Married	0.545***	0.006	0.062*	0.028
Separated, Divorced, Widowed	0.104***	0.005	-0.164***	0.026
Female head of household	0.176***	0.007	0.737***	0.031
No household head	1.137***	0.013	5.578***	0.044
Year (Reference: 2007)				
2008	0.032***	0.008	-0.153***	0.030
2009	0.01	0.008	-0.44***	0.030
2010	0.053***	0.008	-0.627***	0.030
2011	0.147***	0.008	-0.745***	0.031
2012	0.251***	0.008	-0.887***	0.032
2013	0.354***	0.008	-0.869***	0.033
2014	0.482***	0.009	-0.823***	0.035
2015	0.573***	0.009	-0.738***	0.034
2016	1.024***	0.01	0.332***	0.033
Observations	1,997,381			
Pseudo R^2	0.0838			
Log likelihood	-1050181.5			

All race and ethnicity categories are mutually exclusive. All race categories denote Non-Hispanic individuals. * Statistically significant at the 5 percent level; ** at the 1 percent level; *** at the 0.1 percent level.

Table A2. Cohort estimates of Cumulative Receipt of TANF and SNAP by Age 6 by Metropolitan Residence Status

	# of Children who before the Age of 6 were at One Point on DSS			Unique Children	On SNAP or TANF in YOB+5	Cohort Size (Live Births by Year)[a]	Percent of Cohort on DSS before the Age 6 (4)/(6)	Percent of Cohort on DSS in the Year of 5th Birthday (5)/(6)
	SNAP Only	TANF Only	SNAP/TANF					
Panel A: All Children	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Cohort 1, Born 2007	*44,571*	*1,465*	*17,916*	*48,868*	*35,638*	108,738	44.94%	32.77%
Cohort 2, Born 2008	*45,942*	*1,426*	*17,563*	*49,890*	*35,302*	106,536	46.83%	33.14%
Cohort 3, Born 2009	*45,188*	*1,329*	*16,825*	*49,030*	*33,568*	104,832	46.77%	32.02%
Cohort 4, Born 2010	*44,558*	*1,126*	*15,005*	*48,046*	*31,554*	102,936	46.68%	30.65%
Panel B: Only Metropolitan								
Cohort 1, Born 2007	35,522	1,237	14,235	39,115	28,339	96,094	40.70%	29.49%
Cohort 2, Born 2008	36,639	1,171	13,891	39,890	27,944	94,240	42.33%	29.65%
Cohort 3, Born 2009	36,377	1,113	13,475	39,607	26,733	93,310	42.45%	28.65%
Cohort 4, Born 2010	35,964	923	12,013	38,928	25,245	91,476	42.56%	27.60%
Panel C: Only Nonmetropolitan								
Cohort 1, Born 2007	7,219	166	2,660	7,788	5,602	12,790	60.89%	43.80%
Cohort 2, Born 2008	7,470	193	2,667	8,045	5,706	12,446	64.64%	45.85%
Cohort 3, Born 2009	7,024	152	2,423	7,519	5,266	11,749	64.00%	44.82%
Cohort 4, Born 2010	6,973	155	2,204	7,418	4,907	11,526	64.36%	42.57%
Panel D: Switchers								
Cohort 1, Born 2007	1,830	62	1,021	1,965	1,697	N/A	N/A	N/A
Cohort 2, Born 2008	1,833	62	1,005	1,955	1,652	N/A	N/A	N/A
Cohort 3, Born 2009	1,787	64	927	1,904	1,569	N/A	N/A	N/A
Cohort 4, Born 2010	1,621	48	788	1,700	1,402	N/A	N/A	N/A

[a] Source: National Center for Health Statistics, Division of Vital Statistics. (2019). Natality public-use data 2007-2018. Retrieved from http://wonder.cdc.gov/natality-current.html. NOTE: Columns 7 and 8 of panel B (panel C) provide lower bound estimates of program receipt in metropolitan(nonmetropolitan) counties, comparing receipt among children only observed in metropolitan (nonmetropolitan)counties to all live births in metropolitan(nonmetropolitan) counties. We cannot observe live birth totals among those who switch county metropolitan status, so we cannot estimate program receipt rates for this population (shown in PanelD).

Figure A1. Age First on Program by County of Residence Metropolitan Designation

Panel A: Age First on SNAP
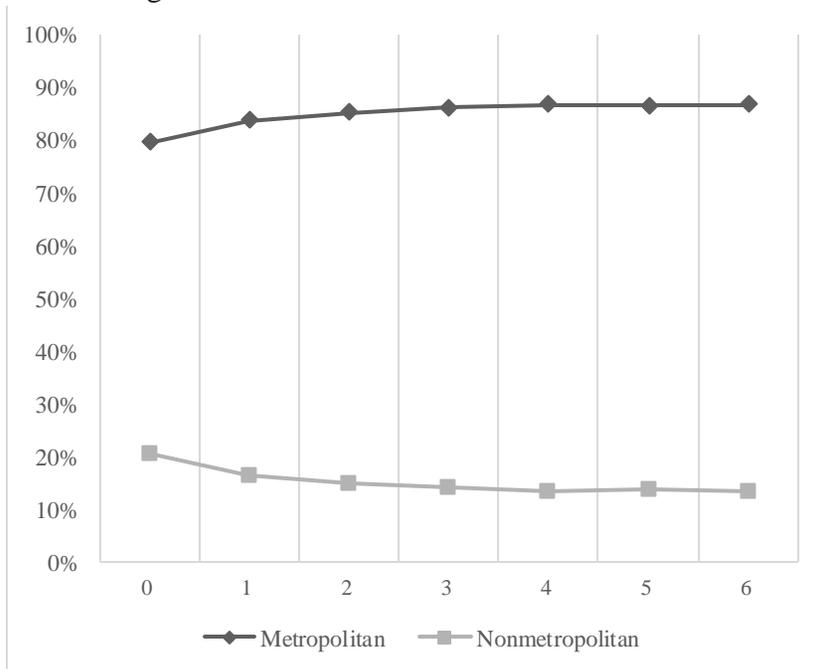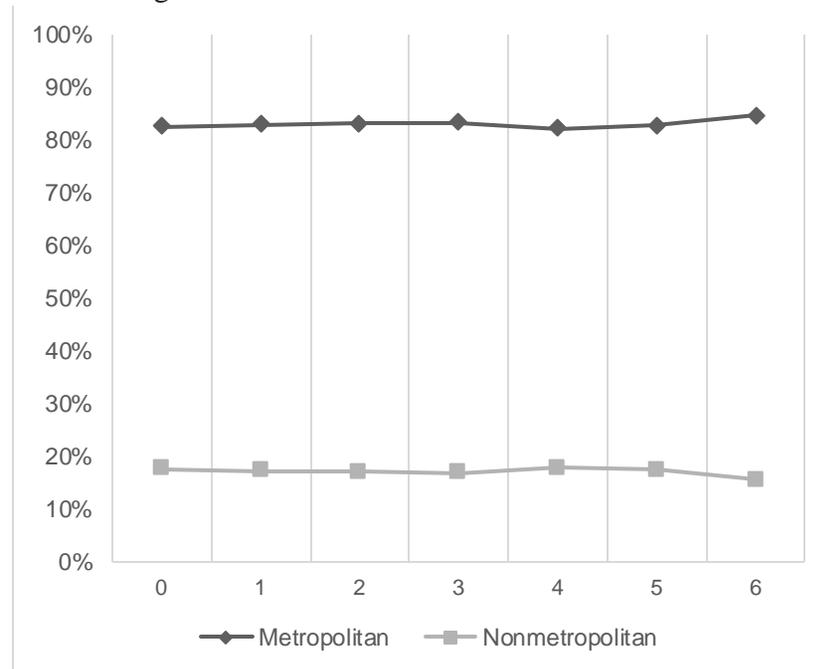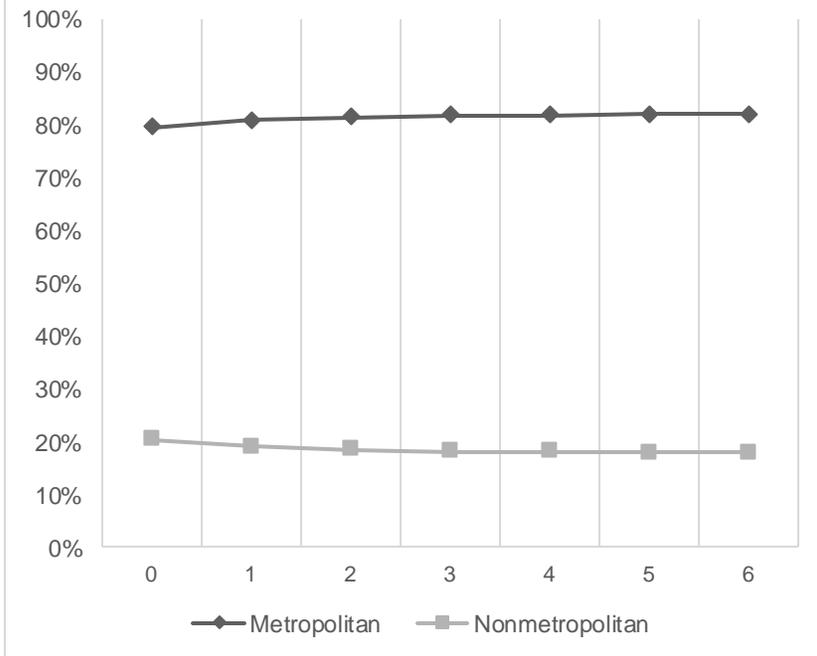
Panel B: Age First on TANF

Figure A2. On Program at Each Age by County of Residence Metropolitan Designation

Panel A: Age First on SNAP

Panel B: Age First on TANF