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No Place Called Home: Student Homelessness Prevalence and Structural Correlates

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HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Abstract

During the 2015–2016 school year, 1.3 million students nationwide experienced homelessness. Yet hardships like homelessness represent dynamic rather than static states, and so annual figures understate the cumulative risk that students face over time. Moreover, despite recent efforts to understand eviction and foreclosure as exploitative and racialized processes, there have been few efforts to connect homelessness to these and other structural conditions. Using administrative data on the population of public school students in Michigan, we found that close to one in ten students experienced homelessness while in school. Moreover, black students were over three times more likely to experience literal homelessness than white students. County-year fixed effects models indicate that rental costs, forced housing moves, and the opioid epidemic were associated with greater student homelessness. These findings have implications for our understanding of racial inequalities and the ways in which disadvantage and inequality are products of exploitative relationships.

Disclaimer

This research result used data structured and maintained by the Michigan Consortium for Educational Research (MCER). MCER data is modified for analysis purposes using rules governed by MCER and are not identical to those data collected and maintained by the Michigan Department of Education (MDE) and/or Michigan’s Center for Educational Performance and Information (CEPI). Results, information and opinions solely represent the analysis, information and opinions of the author(s) and are not endorsed by, or reflect the views or positions of, grantors, MDE and CEPI or any employee thereof.

No Place Called Home: Student Homelessness Prevalence and Structural Correlates

The United States Department of Education estimates that 1.3 million public school students nationally were homeless during the 2015–2016 school year (National Center for Education Statistics 2017). A two-fold increase in the number of homeless students over the past decade has caused alarm among educators and policymakers, as homelessness is thought to be a form of extreme hardship that contributes to other social inequalities (Buckner 2008, Lee, Tyler, and Wright 2010, Miller 2011, Grant et al. 2013). Scholarly interest in homelessness also reflects a turn from income-based measures of hardship to more direct measures of well-being that paint a richer picture of serious disadvantage and expose the relational aspects of poverty (Desmond and Western 2018, Shaefer et al. 2019).

Three decades after social scientists first brought attention to child and family homelessness, knowledge about the prevalence and causes of homelessness remains elusive as this vulnerable population is particularly difficult to identify using traditional survey methods (Shlay and Rossi 1992, Lee, Tyler, and Wright 2010). Much of what we know about the lifetime prevalence of homelessness during childhood comes from retrospective surveys of older adults who came of age during more favorable economic conditions than those that prevail today in the midst of rising economic inequality. Meanwhile, the United States Department of Housing and Urban Development (HUD) measures cross-sectional homelessness annually, but because homelessness is a dynamic state, static snapshots understate lifetime risk. Recent studies investigating the social and economic causes of homelessness have also neglected pressing social issues related to forced housing moves and the opioid epidemic, which are of interest to inequality scholars.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

This study took advantage of administrative data on the population of public school students that the Michigan Department of Education collected in compliance with the federal McKinney-Vento Homeless Assistance Act.¹ We tracked students as they progressed from kindergarten through twelfth grade, making this study the first to estimate the cumulative risk that students experience family homelessness while in school. We then aggregated the administrative data by county and year to investigate how changing economic and social conditions contributed to family homelessness. Our study improves upon earlier research using HUD Continuum of Care geographic units, which do not correspond to meaningful geographic areas, by introducing new indicators of economic and social distress. This is also one of the few studies to distinguish doubling up—sharing another person’s house because of housing or economic hardship—from what is often referred to as literal homelessness—living in a shelter, transitional housing, hotel or motel, or unsheltered conditions (National Center for Homeless Education 2018). We also report results for a combined measure including both types of homelessness. Although the McKinney-Vento data include unaccompanied youth, we excluded these youth from our count of homeless students to focus explicitly on family homelessness.

We found that close to one out of ten students (9.5 percent) experienced literal homelessness or were doubled up between kindergarten and twelfth grade. Importantly, this burden was highly stratified by race. The risk of homelessness, broadly defined, was two times greater for black and Hispanic students than for white students, while black students were 3.5 times more likely than their white counterparts to experience literal homelessness. In the second part of the study, we estimated fixed effects Poisson models to investigate how the rate of homelessness responded to within-county changes in economic and social conditions. Although

¹ U.S. Public Law 100-77 (1987).

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

results varied across the three measures of homelessness (any homelessness, literal homelessness, and doubling up), we found evidence that homelessness increased with a rise in evictions as well as the emerging opioid epidemic and declined with the availability of housing vouchers. These findings have implications for our understanding of racial inequalities and the ways in which disadvantage relates to exploitative market relationships.

Background

Educational, Health, and Behavioral Consequences of Student Homelessness

Homelessness is an enduring social problem that affects children and families living in cities as well as suburban and rural communities across the country. Child and family homelessness is associated with a host of negative outcomes related to physical and mental health, social behavior, and education (see Buckner 2008, Miller 2011, Grant et al. 2013). Homeless children are at increased risk for chronic health conditions related to asthma, lead exposure, and nutritional deficits (Alperstein, Rappaport, and Flanigan 1988, Wood et al. 1990, Grant et al. 2007) as well as mental health problems (Bassuk, Richard, and Tsertsvadze 2015, Jetelina et al. 2016). Homeless students are also more likely than their peers to experience school mobility and grade retention (Buckner, Bassuk, and Weinreb 2001, Rafferty, Shinn, and Weitzman 2004) and perform worse on math and reading standardized tests (Obradović et al. 2009, Cutuli et al. 2013, Cowen 2017). Because homelessness is viewed as a consequential form of deprivation, there is considerable interest in counting the number of homeless individuals and estimating the risk that people will experience homelessness over the life course (Shlay and Rossi 1992, Lee, Tyler, and Wright 2010).

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Prevalence of Homelessness

In 2017, HUD (2018) estimated that on a single night in January there were 551,000 sheltered and unsheltered homeless individuals and that 1.4 million people passed through U.S. shelters that year. Yet, these estimates understate the severity of homelessness, as they exclude people who are doubled up and often miss the “hidden homeless” living in cars, abandoned buildings, and other less visible places (Hopper et al. 2008, Auerswald and Adams 2018). Another critical limitation is that point-in-time and annual shelter counts do not speak to the risk of experiencing homelessness over the life course. While less than 0.2 percent of the population may experience homelessness on a given night, the vast majority of families entering shelters remain there for relatively short durations (Culhane et al. 2007), meaning that many more families cycle through homelessness than are captured by point-in-time or annual shelter counts.

Previous efforts to address the shortcomings of point-in-time and annual shelter counts have used retrospective surveys of adults to estimate prevalence over extended periods. In these studies, lifetime prevalence ranged from 4.6 to 7.4 percent for literal homelessness and up to 14.0 percent when including doubling up (Link et al. 1994, Fusaro, Levy, and Shaefer 2018). Link and colleagues (1994) found that 4.7 percent of surveyed adults experienced homelessness (including doubling up) during childhood. And, although contemporary HUD point-in-time and shelter counts (2017, 2018) show that black families are overrepresented among the homeless, early survey-based research on homelessness did not find significant racial differences in lifetime prevalence rates (e.g., Link et al. 1994, Ringwalt et al. 1998). However, a more recent study of older adults found that blacks and Hispanics were 3.5 and 1.7 times, respectively, more likely than whites to have experienced homelessness over the life course (Fusaro, Levy, and Shaefer 2018).

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Because all of these studies surveyed adults born before the surge in child and family homelessness during the 1980s (Shlay and Rossi 1992), it is less clear how the risk of homelessness and racial disparities in prevalence rates may have changed for more recent birth cohorts. A recent study of unaccompanied youth identified 12-month household prevalence rates ranging from 1.3 percent for “couch-surfing” to 3.0 percent for literal homelessness among youth ages 13 to 17 (Morton et al. 2018). These short-term prevalence rates suggest that estimates based on earlier cohorts may understate the cumulative lifetime risk of homelessness today. At the same time, this study was based on a telephone survey of adults who were asked to provide information on youth in the household who ran away, were asked to leave, or were homeless. The prevalence of unaccompanied youth is important social problem, but this form of homelessness is distinct from child and family homelessness, the focus of the present study, which occurs when entire families are displaced.

Child and Family Homelessness Trends

During the 1980s, families with young children became one of the fastest-growing segments of the homeless population (Rog, Holupka, and Patton 2007). By the late 1990s, young children were at greater risk than any other age group of entering a shelter over the course of a year (Culhane and Metraux 1999). Today, families with children account for one-third of the homeless population. The number of families with children experiencing homelessness increased during the Great Recession but has since fallen to just below pre-recession levels (U.S. Department of Housing and Urban Development 2018).² In contrast, United States Department of Education school administrative data show a substantial increase in student homelessness in recent years (National Center for Education Statistics 2017). As we will discuss, the increase is

² These trends refer to the point-in-time counts. HUD annual shelter use data show a similar pattern except that in 2017, the number of families with children using a shelter during the year remained just above 2007 levels.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

driven by a higher incidence of doubling up—a form of homelessness excluded from HUD counts—as well as improvements in the identification and reporting practices at the state level.

Explanations for Child and Family Homelessness

Today, scholars agree that homelessness is caused by a confluence of individual and family risk factors and structural conditions (O’Flaherty 2004, Lee, Tyler, and Wright 2010). Individual-level problems more stereotypically associated with homelessness among single adult men, such as mental health and substance abuse issues, were associated with family homelessness in early studies (Bassuk and Rosenberg 1988, Bassuk et al. 1997), but more recent work failed to find strong support for a connection (Fertig and Reingold 2008). Indeed, homeless mothers appear to be no more likely than housed poor mothers to have mental health or substance use problems, and the two groups have similar levels of educational attainment, work experience, and criminal histories (Culhane et al. 2007). On the other hand, sources of instability related to domestic violence (Bassuk, Perloff, and Dawson 2001, Fertig and Reingold 2008), the birth of a severely ill child (Curtis et al. 2010, 2013), unstable employment (Edin and Shaefer 2015, Gubits et al. 2018) and paternal incarceration (Wildeman 2014) may explain why some poor families become homeless while others do not.

Structural factors related to large-scale changes in socioeconomic conditions, housing affordability, and declines in the social safety net are also thought to contribute to family homelessness (Lee, Tyler, and Wright 2010). For example, homelessness has been associated with the percentage of blacks, Hispanics, and female-headed households in a community, but results often vary between and within studies depending on how homelessness is defined (e.g., Elliott and Krivo 1991, Honig and Filer 1993, Byrne et al. 2013, Byrne et al. 2014). While most studies find no connection between community-level measures of homelessness and changes in

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

community poverty and unemployment rates over time (Byrne et al. 2014, Hanratty 2017), family poverty is highly correlated with homelessness in studies of individual families. For example, Walton, Dastrup, and Khadduri (2018) find that families entering homeless shelters have extremely low incomes and experience numerous economic shocks in employment and family composition, in line with findings from recent ethnographic work on families with extreme low cash incomes (Edin and Shaefer 2015).

A persistent finding in the literature is that high rental costs contribute to greater homelessness (Honig and Filer 1993, Quigley, Raphael, and Smolensky 2001, Lee, Tyler, and Wright 2010, Byrne et al. 2014, Hanratty 2017). Higher vacancy rates—an indication of greater housing availability—have also been linked to lower rates of homelessness (Quigley, Raphael, and Smolensky 2001) and doubling up (Fertig and Reingold 2008). Meanwhile, recent work has called attention to forced housing moves as a precursor to homelessness. For example, Collinson and Reed (2018) found that eviction increased the risk and duration of shelter use among individuals in New York City. Similarly, two studies found that community-level homelessness rates increased with a rise in local area foreclosures (Goodman, Messeri, and O'Flaherty 2016, Faber 2019). However, to our knowledge, there are no quantitative studies investigating the association between forced housing moves and other forms of homelessness such as doubling up.

Earlier studies found that cash assistance through Temporary Assistance for Needy Families (TANF) has the potential to buffer the most vulnerable families from material hardship and housing instability, but a decline in the accessibility of cash assistance, in part through punitive policies such as harsh sanctions and time limits, has greatly reduced the reach of this program (Kalil, Seefeldt, and Wang 2002, Shaefer, Edin, and Talbert 2015). A recent study relying on within-state changes in TANF caseloads over time found that for every 100 fewer

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

cash assistance cases in a state, there were an additional 14.9 more homeless students (Shaefer et al. 2019). Because TANF policy is set at the state level and the current study is limited to a single state, we do not investigate the effects of cash assistance on homelessness. Instead, we focus on housing assistance, where the availability of housing assistance varies across counties due to differences in program administration by Local Public Housing Agencies. Permanent supportive housing (PSH) and housing choice vouchers (HCV) are thought to be two of the most effective means for combatting homelessness. PSH couples low-cost housing with supportive services for chronically homeless people, whereas HCVs subsidize the cost housing in the private rental market for low-income households. Recent studies have linked the observed decline in HUD point-in-time counts to an expansion in PSH that began in 2007 (Byrne et al. 2014, Corinth 2017). A recent intervention found that HCVs reduced reentries into homelessness among people staying in emergency shelters (Gubits et al. 2018). However, we know less about how the supply of HCVs at the community level impacts aggregate levels of homelessness (O'Flaherty 2019).

Despite an emphasis in previous decades on substance use as a potential risk factor for homelessness, there has been surprisingly little interest in understanding child and family homelessness as a possible consequence of the opioid epidemic (Chatterjee, Yu, and Tishberg 2018). A three-fold increase in the drug overdose death rate from 1999 to 2016 has been driven largely by opioid-related overdoses and has disproportionately affected working-age adults in their prime childrearing years (Hedegaard, Warner, and Miniño 2017). In contrast to earlier research associating substance use with homelessness, our study does not conceive of this problem as an individual failing but rather as the consequence of declining economic prospects

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

and perverse financial incentives motivating doctors and pharmaceutical companies (Case and Deaton 2017).

In addition to showing that homelessness is a fairly common occurrence among school-age children, our study seeks to understand how the rate of homelessness changes with underlying social and economic conditions. In this respect, we are interested in how rental costs, forced housing moves, and the opioid epidemic contribute to aggregate rates of student homelessness, rather than the effect of these events on the individual probability of homelessness. We emphasize these areas because whereas scholars have called attention to the potential for exploitation in the housing market and the over-prescription of pain medication, few studies have investigated these phenomena in relation to homelessness. By examining these factors from a macro perspective we are able to illustrate the broader social cost of these maladies in terms of student homelessness at the community level.

Method

Data

The first part of the study examining the prevalence of homelessness among students leveraged 15 years of administrative data from the State of Michigan Department of Education on the population of public school students for SY 2002–2003 to 2016–2017. These data allowed us to follow individual students from kindergarten through twelfth grade. The federal McKinney-Vento Homeless Assistance Act requires schools to maintain a continuous count of homeless students and to provide these students with services designed to keep them enrolled in school. Michigan is the nation's tenth-largest state by overall student enrollment but had the sixth-highest count of homeless students during the most recent school year (Erb-Downward and

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Evangelist 2018). Federally mandated McKinney-Vento coordinators and liaisons at the state and the district level ensure schools comply with state and federal laws and eligible students receive services. The McKinney-Vento Act defines children as homeless if they lack a fixed, regular, and adequate nighttime residence. The administrative data allowed us to further distinguish students who were doubled up from those living in shelters, hotels or motels, transitional housing, or in unsheltered locations (e.g., street, car, or abandoned building). The McKinney-Vento data include unaccompanied youth but are known to underestimate the size of this population (Perlman et al. 2014, Auerswald and Adams 2018). For this reason, we retained these students in the study population but did not include them in the count of homeless students, thereby allowing us to focus on family homelessness.

The second part of study investigated structural conditions related to homelessness using the most recent eight years of the state administrative data spanning SY 2009–2010 to 2016–2017. After collapsing the administrative data by county and year to produce counts of the total number of homeless students, we merged the county–year homelessness data with external data on county socioeconomic characteristics, housing market conditions, housing assistance availability, and indicators of housing and social hardships. External sources are summarized in Table 1 and described in greater detail below. A major difference between the present study and earlier studies is that the administrative data allowed us to estimate homeless counts at the county level. Other recent studies (e.g., Hanratty 2017) have used data that aggregate homelessness for HUD Continuum of Care (CoC) units, which do not map onto Census boundaries or necessarily correspond to socially meaningful geographic units. For example, the largest CoC in Michigan includes over 60 of the state’s 83 counties while spanning the entire length and width of the state.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

[INSERT FIGURE 1]

Data limitations. State administrative data are a relatively untapped source of information on homelessness that could supplement what we have learned from HUD counts and survey data. But as is true of all data sources on homelessness, the administrative data have limitations that could lead to undercounts of student homelessness. Figure 1, which excludes unaccompanied youth, illustrates that the percentage of homeless students increased rapidly between SY 2006–2007 and SY 2011–2012, during which time the state implemented new data gathering and reporting procedures designed to improve school district counts of homeless students. Because this change coincided with the onset of the Great Recession, it is impossible to know how much improved reporting contributed to the rise in homelessness, but it is likely that homelessness was underreported prior to the procedural changes. In addition, understaffing has led the predominately nonwhite Detroit Public Schools Community District to undercount the number of homeless students, which could bias counts of homelessness among nonwhite students downward (Erb-Downward and Evangelist 2018). Indeed, the percentage of homeless students in the district was lower than the state average even though 85 percent of the district’s students qualified for free or reduced price lunch in the final year of the study. In comparison, half of all students statewide qualified for subsidized lunch that year. In light of these limitations, it is important to recognize that our estimated probabilities of homelessness should be viewed as a lower bound. Although there is no entirely satisfactory solution to these limitations, we will discuss several sensitivity analyses.

[INSERT TABLE 1]

Measures

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Homelessness. For the first part of the analysis, the outcome of interest is the probability that students experienced one of three forms of homelessness. The first outcome, which we simply refer to as *homeless*, is consistent with the McKinney-Vento Act definition of homelessness and includes children who were doubled up or living in a shelter, hotel or motel, transitional housing, or unsheltered location.³ The second outcome *literally homeless* excludes children who were doubled up from the definition of *homeless*.⁴ Finally, the category *doubled up* is limited to students who shared housing because of housing loss or economic hardship. For the second part of the analysis, we collapsed the individual-level data to generate a county-year count of students in each of the three categories as well as an overall count of students. As mentioned, we excluded unaccompanied youth from our counts of homeless students.

Student characteristics. The state administrative data included basic demographic information on all students. The first part of the analysis used information on grade level (kindergarten through twelfth grade) and race or ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, Asian, and other). We do not report results for the “other” category that included a small number of Native American and Hawaiian or Pacific Islander students.

County characteristics. The second part of the study on structural explanations for homelessness drew on time-varying measures of county socioeconomic characteristics, rental market conditions, forced housing moves, opioid usage, and housing assistance availability. Socioeconomic characteristics included the percentage black and percentage Hispanic for each county based on the Census Bureau's Population Estimates Program that uses information on

³ In 2016, Congress changed the McKinney-Vento rules to exclude children transitioning to foster care. We maintain consistency across years by not counting students as homeless if transition to foster care was the only stated reason for homelessness.

⁴ We considered the 1.6 percent of homeless students who were doubled up and literally homeless in the same year to be literally homeless.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

births, deaths, and migration to produce population estimates for intercensal years. We also included the child poverty rate for children under age 18 from the Census Small Area Income and Poverty Estimates and the unemployment rate from the Bureau of Labor Statistics Local Area Unemployment Statistics.

We measured local rental market conditions using the county median rent and the rental vacancy rate. Median rents were from the HUD 50th percentile rent estimates for a two-bedroom apartment. The rental vacancy rate was the only county-level measure used in the study that was not available on an annual basis. Therefore, we used the five-year American Community Survey (ACS) for 2005–2009 and 2012–2016 with intercensal years filled in by linear interpolation.

Forced housing moves were measured with the eviction rate (evictions as a percentage of renter-occupied homes) and the foreclosure rate (foreclosures as a percentage of outstanding mortgages). This study was one of the first to take advantage of new data on evictions compiled by the EvictionLab from court records obtained from states, counties, and private companies (Desmond et al. 2018). Foreclosure rates came from monthly county estimates by the Federal Reserve Bank of New York for January 2009 to June 2014.⁵ Because data were only available for the first half of 2014, we created an annual average based on the average monthly foreclosure rate for the first six months of each year. As we will discuss, we used multiple imputation to fill in missing data for 2015 and 2016.

We measured federal housing assistance availability as the number of vouchers per 100 people living below the poverty line in each county. The number of vouchers was from the HUD Picture of Subsidized Households dataset. We chose vouchers over other forms of assistance because all counties have vouchers available, whereas public housing and project-based

⁵ Federal Reserve Bank of New York. "Community Credit Profiles: Mortgage Markets." accessed March 6, 2019. <https://www.newyorkfed.org/outreach-and-education/community-credit-profiles#overview>.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

assistance were not available everywhere. However, because vouchers were issued when public housing units were demolished or sold, we likewise controlled for the number of public housing units per 100 people living below the poverty in each county.

Although drug use has been associated with homelessness at the individual level, to our knowledge this is the first study to incorporate aggregate measures of this social problem. We used drug-related deaths per 100,000 persons and opioid prescriptions per 100 persons from the Centers for Disease Control (CDC) to measure the impact of the opioid epidemic at the county level (Rossen et al. 2019).⁶ Opioids were involved in two-thirds of drug-related deaths in 2017 (Scholl et al. 2019). Nationally, opioid prescribing has declined since its peak in 2012 but this decline has been offset by growth in fentanyl and heroin use, while the drug-related death rate has continued to climb through 2017 (Centers for Disease Control and Prevention 2018, Rossen et al. 2019).

Analysis Plan

Event history analysis. The first part of the analysis employed life table methods (see Singer and Willett 2003) to estimate the probability that students first experienced homelessness in a particular grade. This means that once students experienced homelessness, they were removed from the risk set in subsequent grades. From the grade-specific probabilities, we then estimated the cumulative probability of experiencing homelessness while in school. We estimated the probability of homelessness for the total population of students and for sub-groups of students broken out by race for the outcomes: homeless, literally homeless, and doubled up.

Event history methods are particularly well-suited for our longitudinal data where there was both left and right censoring. In this study, students were right-censored if they left the

⁶ Centers for Disease Control. "U.S. Opioid Prescribing Rate Maps." accessed October 10, 2019. <https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html>.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Michigan school system prior to graduation. Left censoring occurs when participants experience the outcome prior to the beginning of the study. We accounted for left censoring by limiting the study population to students observed from kindergarten onward, meaning that all students enter the study at the same grade level and were observed until they experienced homelessness, graduated, or left the school system. However, it is critical to recognize that as we did not observe homelessness prior to kindergarten, our estimates should be viewed as the probability of experiencing homelessness while enrolled in school rather than a prevalence rate from birth.

Structural conditions related to homelessness. In the second part of the analysis, we collapsed the student-level data by county and year to generate counts for each type of homelessness and then merged this dataset with county characteristics. In light of the aforementioned data quality and availability issues, this part of the analysis was restricted to SY 2009–2010 to 2016–2017. We then estimated Poisson models predicting the count of homeless students while controlling for time-varying county characteristics as well as county and year fixed effects. Because fixed effects estimation relies on within-unit variation, coefficients are interpreted as the average within-county effect over the study period. The advantage is that county fixed effects control for unobserved time-invariant confounders that may have biased coefficient estimates in cross-sectional studies. Because the number of homeless students in a county depends on population size, we included the total number of students for each county-year observation as an offset to express the outcome as a rate (see Long and Freese 2014). All models were estimated using Huber-White cluster-robust standard errors.

We imputed missing values for the eviction rate ($n = 34$), foreclosure rate ($n = 172$), and opioid prescriptions ($n = 13$) using the program Amelia II, which was designed to impute repeated observations within cross-sectional units (Honaker and King 2010). We imputed 30

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

datasets following the convention that the number of imputations should be equal to the percentage of missing cases (White, Royston, and Wood 2011). All regression models were estimated using Stata's `mi estimate` suite (StataCorp 2017).

Results

Descriptive Results

Figure 1 summarizes the percentage of students in kindergarten through twelfth grade who at some point during the school year were either (1) homeless, (2) literally homeless, or (3) doubled up over the study period spanning SY 2002–2003 to 2016–2017. The percentage of students experiencing any of these forms of homelessness increased sharply around the start of the Great Recession in 2007, driven largely by increases in the percentage of students who were doubled up. By SY 2014–2015, 2.0 percent of students were homeless, including 0.5 percent who were literally homeless and 1.5 percent who were doubled up.⁷

Table 1 provides unweighted county-level descriptive statistics for each of the three outcomes and all predictors used in the multivariable regressions in the second part of the analysis. The table also describes the mean within-county increase for each of the variables after residualizing them with respect to year fixed effects (Mummolo and Peterson 2018). The mean within-county increases may be used in conjunction with regression coefficients to estimate plausible counterfactuals based on observed within-county changes in the covariates over the study period and are particularly helpful for interpreting the substantive effects of the covariates.

⁷ To put the percentages in perspective, in SY 2016-2017 there were approximately 30,325 homeless students, including 8,467 who were literally homeless and 21,858 who were doubled up.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Estimating the Probability of Experiencing Homelessness using Event History Methods

The left-hand column of Figure 2 summarizes the probability, both overall and by race and ethnicity, that students will first experience homelessness in a specific grade, with the caveat that we do not have information on homeless spells that occurred prior to kindergarten. The top left panel shows the results for the broadest definition of homelessness that encompasses literal homelessness and doubling up. The curve indicates that the youngest students were most susceptible to homelessness while the risk of homelessness generally fell as students progressed through school. The middle- and bottom-left panels show that the probabilities of literal homeless and doubling up were also highest for the youngest students. The grade-specific probabilities for the three types of homelessness followed a similar shape across racial and ethnic groups. However, the distance between the curves indicates that there were stark racial differences in the grade-specific probability of first experiencing homelessness.

[INSERT FIGURE 2]

The top right panel indicates that overall, 9.5 percent of the students experienced homelessness before graduating or leaving school. However, the cumulative probability of homelessness varied across racial groups as 15.7 percent of black students and 13.6 percent of Hispanic students experienced homelessness, compared to 7.6 percent of whites and 1.6 percent of Asians. Racial differences in the probabilities for literal homelessness displayed in the middle-right panel are particularly troubling. Relative to whites, the cumulative probability of literal homelessness was 3.5 times higher for blacks and 2.2 times higher for Hispanics. Finally, the bottom-right panel indicates that blacks and Hispanics each had close to a 11 percent chance of being doubled up while in school, whereas the probability for whites was 6.3 percent. Overall, Asian students had a considerably lower probability of experiencing any form of homelessness

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

relative to other students. Although unaccompanied youth were not counted as homeless in the main results, a supplemental analysis (not shown) found that including unaccompanied youth increased the cumulative probability of homelessness from 9.5 to 11.0 percent for overall homelessness, 3.2 to 3.5 percent for literal homelessness, and 7.4 to 8.8 percent for doubling up.

Identifying Structural Conditions Related to Homelessness

In the second part of the analysis, we transition to the county–year dataset to investigate various structural conditions related to homelessness. Table 2 presents results from fixed effects Poisson models predicting the number of students who were homeless, literally homeless, and doubled up. The table displays transformed coefficients indicating the percentage change in the number of homeless students for a one-unit change in each independent variable. Because a one-unit change may not correspond to realistic variation in the covariates, we also display transformed coefficients corresponding to the average within-county range displayed in Table 1.⁸ The mean within-county range illustrates potential effect sizes based on changes in the covariates over the study period. The mean within-county variation was often considerably greater than a one-unit change; nonetheless, we generally refer to the standard one-unit change for the sake of simplicity.

[INSERT TABLE 2]

Model 1 shows results for the McKinney-Vento definition of homelessness that includes students who are literally homeless or doubled up. On average, the number of homeless students increased by 7.9 percent for a one percentage point increase in the percentage of the county population that was black, holding the other covariates constant. Note that because there was

⁸ The transformation is $(e^{(\gamma \times \beta)} - 1) \times 100$ where γ represents either a one-unit increase in the independent variables or the mean within-county increase after residualizing the independent variable with respect to year fixed effects.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

little within-county variation in this covariate, the counterfactual increase in the number of homeless students based on the average within-county range displayed in the second column was considerably smaller. For example, this second column indicates that the number of homeless students increased by 2.7 percent for a 0.4 percentage point increase (the mean within-county range over the study period displayed in Table 1) in the percentage of the county population that was black. The housing-related covariates proved to be important predictors of homelessness. For example, the number of homeless students increased by 12.0 percent for a \$100 increase in rent. Likewise, homelessness increased by 2.0 percent for a one percentage point increase in evictions. Furthermore, for every additional drug-related death per 100,000 persons and opioid prescription per 100 persons, the number of homeless children increased by 1.1 and 0.4 percent, respectively. Note that the effect sizes associated with the mean within-county ranges were considerably larger given the dramatic increase in drug-related deaths and opioid prescriptions over the study period. Consistent with earlier studies, aggregate changes in poverty and unemployment had no association overall rates of homelessness in this and subsequent models. Although these factors are important causes of homelessness in individual-level studies, the overall count of homeless students did not change in response to aggregate shifts in these covariates.

Model 2 reports results for the subset of students experiencing literal homelessness. The number of students experiencing literal homelessness increased by 4.7 percent for a one-unit increase in the eviction rate and by 13.4 percent at the mean within-county change. Somewhat surprisingly, literal homelessness appears to have declined 16.0 percent with a one percentage point increase in county foreclosure rates. It is possible that counties with a high percentage of homeowners and foreclosures also devoted more public and private resources toward

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

homelessness prevention. Another possibility is that foreclosed properties provided a place to stay for people who otherwise would have been literally homeless. More in line with expectations, an increase of one housing voucher per 100 persons in poverty resulted in an 11.5 percent decrease in literal homelessness. Consistent with the previous model, literal homelessness increased by 0.7 percent with a one-unit change in opioid prescriptions while the percent increase was 14.0 percent at the mean within-county range.

Lastly, Model 3 displays results for students who were doubled up—the most common form of homelessness. Once again, an increase in the percent black was associated with a significant increase in the number of students who were doubled up. In addition, a \$100 increase in the county median rent resulted in a 13.3 percent increase in doubling up. Likewise, doubling up increased by 8.9 percent for a one percentage point increase in the county foreclosure rate. In both cases, the effect sizes were slightly smaller at the mean within-county ranges. In this model, drug-related deaths also resulted in a 1.3 percent increase in doubling up, and the effect size was substantively larger at the mean within-county range.

Sensitivity Analysis

Because the event history part of the study spanned SY 2002–2003 to 2016–2017, we were able to estimate the cumulative probability of experiencing homelessness while in school by observing several cohorts from kindergarten through twelfth grade. The tradeoff is that inconsistent data reporting prior to SY 2009–2010 could bias the cumulative probability of experiencing homelessness downward. Moreover, underreporting of homelessness in the predominately nonwhite Detroit Public Schools Community District may understate racial differences in the likelihood of experiencing homelessness. We performed a sensitivity analysis that restricted the observed time period to SY 2009–2010 to 2016–2017 and excluded Detroit

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

public school students. The shorter observation period limits observation of students from kindergarten through seventh grade but provides a check on the plausibility of the main results. Table A1 in the Appendix compares the cumulative probability of experiencing homelessness from kindergarten through seventh grade for the main analysis with an analysis that is limited to SY 2009–2010 to 2016–2017 and excludes Detroit public school students. This comparison suggests that the main results likely understate the cumulative probability of experiencing homelessness and should be viewed as a floor. For example, whereas 6.7 percent of students in the main analysis had experienced homelessness by the end of seventh grade, this percentage increases to 8.2 percent in the sensitivity analysis. However, racial differences in the cumulative probabilities were similar across analyses. That being said, it is possible that observed racial differences could be biased in either direction if undercounts are associated with school district demographics. For example, while the undercount in Detroit is widely acknowledged, similar patterns could prevail in other predominately black school districts or in predominately white rural areas where less attention is given to homelessness. More work is needed to understand the nature of undercounts in the McKinney-Vento data. We also estimated alternative regression models that excluded Wayne County, which encompasses the Detroit Public Schools Community District, and dropped the last two years of the study where we imputed missing foreclosure rates. We also examined each of these alternative specifications individually. Overall, Table A2 shows that the results were substantively similar across specifications with the exception that the relationship between housing choice vouchers and literal homelessness was negligible in models that excluded the final two time periods.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Discussion

This is the first study to leverage state administrative data to investigate the prevalence and causes of homelessness among school-aged children and youth. These unique data allowed us to portray a rich picture of serious disadvantage in society by moving from imperfect proxies for disadvantage, like income, to direct measures of well-being (Shaefer et al. 2019). By observing students over an extended period, we were able to show that homelessness is an all-too-common experience, particularly among minority students. Our findings add to a growing body of research showing that when viewed over the life course, dynamic markers of hardship such as the experience of income poverty, food stamp usage, and incarceration are far more common than cross-sectional studies reveal (Rank and Hirschl 1999, Grieger and Danziger 2011, Enns et al. 2019).

We found that between kindergarten and twelfth grade, 9.5 percent of students were homeless at some point, with 3.2 percent of students experiencing literal homelessness and 7.4 percent having been doubled up. As the high incidence of doubling up illustrates, HUD estimates clearly overlook a crucial aspect of homelessness that some have argued may be as traumatic as moving into a shelter. Although doubling up may seem like a more welcome alternative to living in a shelter, it is also associated with interpersonal conflict, overcrowding, and domestic violence and is often a precursor to literal homelessness (Wright et al. 1998, Miller 2015). There were also stark racial differences in the cumulative risk of homelessness, particularly for literal homelessness, where black and Hispanic students were 3.5 and 2.2 times more likely, respectively, than their white peers to experience homelessness.

Close to one out of ten students overall and one out of six black students experienced some form of homelessness while enrolled in school. As mentioned earlier, these estimates

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

should be considered a lower bound, as there is variation between schools and over time in regard to identifying homeless students. Moreover, our main results did not include unaccompanied youth. Other survey-based studies have found that about three percent of high-school-age youth had experienced unaccompanied homelessness in the months prior to being surveyed (Perlman et al. 2014, Morton et al. 2018), while our supplemental analysis revealed that the cumulative probability of experiencing homelessness increased from 9.5 percent to 11.0 percent with the inclusion of unaccompanied youth.

In the present study, the probability of being literally homeless or doubled up during childhood was about two times higher than earlier survey-based estimates that used a similar definition of homelessness (Link et al. 1994), while racial differences in prevalence rates were comparable to a more recent survey of older adults (Fusaro, Levy, and Shaefer 2018). In our study, the black-white gap was twice as large for literal homelessness as for doubling up. One potential reason for this disparity is that among homeless families, black families are much more likely than their white counterparts to be literally homeless, perhaps reflecting a lack of access to well-resourced kin and friend networks that could help them avoid literal homelessness by providing a temporary place to stay (Heflin and Pattillo 2006, Desmond 2012). Because homelessness is associated with a host of negative outcomes (Buckner 2008, Miller 2011, Grant et al. 2013), disproportionate exposure to homelessness among minority students may also contribute to racial disparities in graduation rates, academic performance, and health outcomes.

In particular, minority students are doubly disadvantaged in that they are most likely to experience homelessness and to be concentrated in segregated, impoverished schools (Logan, Stowell, and Oakley 2002, Saporito and Sohoni 2007) where finite McKinney-Vento Act resources are likely to be strained. For example, four out of five of the 50,000 students attending

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

the predominately nonwhite Detroit Public Schools Community District qualify for free or reduced-price lunch; yet, until recently this district—by far the state’s largest—had a single staff member responsible for identifying homeless students and connecting them to services. Future work may consider how the allocation of federal resources affects services for homeless students within schools.

This study also contributes to the movement among social scientists to identify alternatives to income-based measures of poverty that expose the relational aspects of hardship. We merged the administrative data with indicators of housing and social hardship to investigate the extent to which within-county changes in structural conditions contributed to increases in the number of homeless students. Our fixed effects research design provides new evidence that homelessness is a potential social cost—a second-order effect—of broader trends in rental costs, forced housing moves, the opioid epidemic, and the limited reach of housing assistance programs. That literal homelessness and doubling up were driven by different housing-related factors suggests two tiers of vulnerability. Families in precarious financial situations are vulnerable to eviction but also the most likely to benefit from housing assistance. Meanwhile, those who once could afford a home or local rental prices are able to turn to friends and family before moving into a shelter. On the other hand, our results indicate that the opioid epidemic is associated with both forms of homelessness.

We argue that homelessness is not simply the product of individual characteristics or impersonal economic forces but rather a consequence of exploitative relationships “whereby the rich take advantage of the poor and profit from their vulnerability” (Desmond and Western 2018, 311). Whereas power imbalances are often thought of in the context of the labor market, recent work on evictions, foreclosures, and the opioid epidemic have called attention to exploitation in

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

consumption markets as a serious social problem (Rugh, Albright, and Massey 2015, Desmond 2016, Case and Deaton 2017, Desmond and Western 2018). In turn, these exploitative relationships are also racialized, particularly in the area of housing, where black and Hispanic individuals and communities are disproportionately harmed by evictions and predatory lending practices (Williams, Nesiba, and McConnell 2005, Desmond, Gershenson, and Kiviat 2015, Rugh, Albright, and Massey 2015). The extent to which disproportionate exposure to exploitative relationships contributed to racial disparities in homelessness is a matter for future study.

Finally, recent work has called attention to how the proliferation of municipal anti-homelessness ordinances have contributed to homelessness by exposing homeless persons to the criminal justice system (Herring, Yarbrough, and Marie Alatorre 2019). We argue that student homelessness is similarly a consequence of conscious policy choices. The negative relationship we found between housing vouchers and literal homelessness contributes to a growing body of research finding that housing and cash assistance programs are indeed an effective means for combatting homelessness (Gubits et al. 2018, Shaefer et al. 2019). Moreover, we found that an increase in rental costs was associated with an increase in doubling up. Yet, despite rising rental costs and growth in the share of families that are severely rent burdened (Joint Center for Housing Studies 2017), real per capita spending on federal housing assistance is approximately the same as it was in 1995 (Moffitt 2013). Nationwide, high rental costs fall disproportionately on the poorest families as the private rental market provides only 21 adequate, affordable housing units for every 100 extremely low-income renters (Getsinger et al. 2017). Today, only one-quarter of eligible households receive federal housing assistance, leaving approximately 14 million households with potentially unstable housing situations (Congressional Budget Office

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

2015). Meanwhile, the United States spends about 2.5 times more on homeowner tax breaks that mainly benefit higher-income households than on federal housing assistance programs (Fischer and Sard 2017).

Limitations

In contrast to HUD point-in-time counts and survey data, the administrative data used in this study enabled us to follow students as they progressed through school and to distinguish between multiple forms of homelessness. Despite these advantages, we were unable to observe students prior to kindergarten and our supplemental analysis that included unaccompanied youth was limited in that the McKinney-Vento data tend to underestimate the size of this population. The limitations of the present study point to the potential benefits of integrated data systems. For example, the ability to link individual shelter records with school administrative data and birth records would enable researchers to study the risk of literal homelessness from birth. Merged shelter and school data would also help policymakers to better understand the nature of undercounts at the school and district levels. Additionally, our study took place in a single state during a period of dramatic economic decline and recovery meaning that the results may not be generalizable to other locations or periods. Nonetheless, Michigan is a large, socioeconomically diverse state that is home to both a major urban center and rural areas. The study period also provided substantial within-county variation in most covariates that is necessary for fixed effects estimation and allowed us to consider the relationship between homelessness and the foreclosure crisis and opioid epidemic. Still, states are federally mandated to collect information on homeless students, making similar studies possible in other areas where socioeconomic and housing conditions vary.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Conclusion

That close to one in ten students will experience family homelessness while in school indicates that extreme hardship is a far more common occurrence than cross-sectional counts would indicate. It is also important to recognize that the structural correlates of homelessness we identified did not materialize in a vacuum but are themselves a product of the laws and financial incentives that structure relationships between landlords and tenants, mortgage lenders and borrowers, and pharmaceutical manufacturers and pain patients. Our results show that the harm these relationships cause does not end at the loss of a home or addiction to pain medications, but carries on through other downstream consequences like homelessness that, in turn, affect the life prospects of children and youth.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

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HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

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Table 1. Descriptive Statistics for County-Year Observations, SY 2009-2010 to 2016-2017

Variable	Pooled summary statistics					Mean within-county range	Source
	Obs.	Mean	Std. Dev.	Min.	Max.		
Number of students	664	18,571.7	41,881.1	175.0	328,645.0	2,041.6	MDE
Homeless (%)	664	2.7	1.5	0.0	9.0	2.0	MDE
Number homeless	664	333.3	522.4	0.0	4,091.0	191.0	MDE
Literally homeless (%)	664	0.5	0.3	0.0	2.5	0.5	MDE
Number literally homeless	664	87.7	168.5	0.0	1,545.0	68.3	MDE
Doubled up (%)	664	2.2	1.4	0.0	7.7	1.7	MDE
Number doubled up	664	245.6	374.3	0.0	3,189.0	150.8	MDE
Black (%)	664	3.8	6.1	0.1	40.5	0.4	Census PEP
Hispanic (%)	664	3.2	2.5	0.7	14.8	0.2	Census PEP
Child poverty (%)	664	24.2	7.0	6.4	53.4	4.6	Census SAIPE
Unemployment (%)	664	9.9	3.5	3.4	24.2	2.3	BLS LAUS
Median rent (hundreds, \$2016)	664	7.6	1.0	5.9	11.6	0.7	HUD
Rental vacancy (%)	664	7.9	3.5	1.4	31.4	3.6	ACS
Evictions (%)	664	4.0	3.1	0.0	15.6	2.7	EvictionLab
Average monthly foreclosures (%)	664	1.5	0.8	0.2	4.1	0.8	FRBNY
Housing choice vouchers per 100 persons in poverty	664	2.9	2.0	0.0	11.9	1.1	HUD
Public housing units per 100 persons in poverty	664	2.0	2.4	0.0	11.9	0.6	HUD
Drug-related deaths per 100,000 persons	664	14.6	4.0	7.0	39.8	4.1	CDC
Opioid prescriptions per 100 persons	664	95.9	37.5	15.0	209.4	19.1	CDC

Results reported for the first imputed dataset.

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Table 2. Poisson Models Predicting the Number of Homeless Students in Kindergarten through Twelfth Grade, SY 2009–2010 to 2016–2017

	(1) Homeless		(2) Literally homeless ^a		(3) Doubled up	
	% Δ (1-unit)	% Δ (mean range)	% Δ (1-unit)	% Δ (mean range)	% Δ (1-unit)	% Δ (mean range)
Black (%)	7.9	** 2.7	-4.0	-1.4	14.7	** 5.0
Hispanic (%)	-9.9	-2.3	-26.8	-6.8	1.5	0.3
Child poverty (%)	-0.3	-1.3	-0.8	-3.5	-0.3	-1.3
Unemployment (%)	1.9	4.3	3.8	8.9	1.7	4.0
Median rent (hundreds, \$2016)	12.0	** 8.3	4.4	3.1	13.3	** 9.2
Rental vacancy (%)	0.2	0.8	1.7	6.2	0.0	-0.2
Evictions (%)	2.0	+ 5.5	4.7	* 13.4	0.8	2.3
Average monthly foreclosures (%)	2.5	2.1	-16.0	* -13.5	8.9	* 7.3
Housing choice vouchers per 100 persons in poverty	-1.9	-2.0	-11.5	* -12.1	2.7	2.9
Public housing units per 100 persons in poverty	-1.3	-0.7	1.9	1.1	-3.9	-2.3
Drug-related deaths per 100,000 persons	1.1	** 4.4	0.3	1.4	1.3	** 5.4
Opioid prescriptions per 100 persons	0.4	* 8.2	0.7	* 14.0	0.3	5.3
County fixed effects	Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes	
Observations	664		656		664	
Number of counties	83		82		83	

Coefficients have been transformed using the formula $(e^{(\gamma \times \beta)} - 1) \times 100$. In the first column of each model, γ equals one, representing the percentage change in the number of homeless students for a one-unit change in each independent variable. In the second column for each model, γ equals the mean within-county range for each independent variable as summarized in Table 1. Models estimated with robust standard errors clustered at the county level.

^a There is one less observation for literally homeless because one county had no students in that category across the study period.

+ p < 0.10 * p < 0.05 ** p < 0.01

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Table A1. Cumulative Probability of Homelessness from Kindergarten through Seventh Grade, Comparison of Main Results with Sensitivity Analysis for SY 2009–2010 to 2016–2017 that also Excludes the Detroit Public Schools Community District

	Homeless			Literally homeless			Doubled up		
	Main	Sensitivity	Diff.	Main	Sensitivity	Diff.	Main	Sensitivity	Diff.
White	5.2	6.7	1.5	1.4	1.8	0.5	4.3	5.6	1.3
Black	11.3	14.3	3.0	5.2	6.7	1.5	7.5	9.9	2.4
Hispanic	9.7	11.1	1.4	3.2	4.2	1.0	7.5	8.5	1.0
Asian	1.2	1.4	0.2	0.4	0.5	0.1	0.9	1.0	0.1
Overall	6.7	8.2	1.5	2.3	2.8	0.5	5.1	6.4	1.3
Black–White ratio	2.2	2.1	0.0	3.8	3.7	-0.1	1.8	1.8	0.0
Hispanic–White ratio	1.9	1.6	-0.2	2.3	2.3	-0.1	1.8	1.5	-0.2

The columns labeled “Main” correspond to Figure 2 and display the cumulative probability of experiencing homelessness through seventh grade for the period SY 2002–2003 to 2016–2017. For comparison, the columns labeled “Sensitivity” restrict the analysis to the period SY 2009–2010 to 2016–2017 and exclude the Detroit Public Schools Community District.

Table A2. Poisson Models Predicting the Number of Homeless Students in Kindergarten through Twelfth Grade, Comparison of Main Results with Alternative Specifications

	Homeless							
	Main results		Ex. Wayne		2009-10 to 2014-15		2009-10 to 2014-15 & Ex. Wayne	
Black (%)	7.9	**	5.4		5.4	+	1.4	
Hispanic (%)	-9.9		-9.4		-10.0		-9.1	
Child poverty (%)	-0.3		0.0		-0.3		0.2	
Unemployment (%)	1.9		1.7		3.6		3.3	
Median rent (hundreds)	12.0	**	12.1	**	8.4	+	8.8	+
Rental vacancy (%)	0.2		0.2		0.7		0.7	
Evictions (%)	2.0	+	2.1	*	3.4	+	3.2	+
Average monthly foreclosures (%)	2.5		1.3		4.7		3.1	
Housing choice vouchers per 100 persons in poverty	-1.9		-1.3		1.7		2.5	
Public housing units per 100 persons in poverty	-1.3		-0.4		-10.5	+	-8.0	
Drug-related deaths per 100,000 persons	1.1	**	1.2	**	0.6		0.8	
Opioid prescriptions per 100 persons	0.4	*	0.4	*	0.6	**	0.6	**
County fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Observations	664		656		498		492	
Number of counties	83		82		83		82	

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Table A2. Poisson Models Predicting the Number of Homeless Students in Kindergarten through Twelfth Grade, Comparison of Main Results with Alternative Specifications (Con't)

	Literally homeless ^a							
	Main results		Ex. Wayne		2009-10 to 2014-15		2009-10 to 2014-15 & Ex. Wayne	
Black (%)	-4.0		-4.2		-2.0		-1.2	
Hispanic (%)	-26.8		-27.9		14.3		13.1	
Child poverty (%)	-0.8		-0.9		0.2		0.3	
Unemployment (%)	3.8		4.0		5.0		5.0	
Median rent (hundreds)	4.4		3.7		1.3		0.0	
Rental vacancy (%)	1.7		1.6		3.4		3.3	
Evictions (%)	4.7	*	4.6	*	6.8	*	6.5	*
Average monthly foreclosures (%)	-16.0	*	-15.4	*	-14.3	*	-11.4	+
Housing choice vouchers per 100 persons in poverty	-11.5	*	-11.6	+	-0.6		-0.8	
Public housing units per 100 persons in poverty	1.9		2.5		-8.3		-5.3	
Drug-related deaths per 100,000 persons	0.3		0.2		-0.4		-0.7	
Opioid prescriptions per 100 persons	0.7	*	0.7	*	0.6	**	0.6	**
County fixed effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Observations	656		648		492		486	
Number of counties	82		81		82		81	

HOMELESSNESS PREVALENCE AND STRUCTURAL CORRELATES

Table A2. Poisson Models Predicting the Number of Homeless Students in Kindergarten through Twelfth Grade, Comparison of Main Results with Alternative Specifications (Con't)

	Doubled up			
	Main results	Ex. Wayne	2009-10 to 2014-15	2009-10 to 2014-15 & Ex. Wayne
Black (%)	14.7 **	12.0 *	10.7 **	5.0
Hispanic (%)	1.5	2.3	-11.3	-10.3
Child poverty (%)	-0.3	0.1	-0.5	0.1
Unemployment (%)	1.7	1.6	3.3	3.0
Median rent (hundreds)	13.3 **	13.7 **	10.1 *	11.3 *
Rental vacancy (%)	0.0	-0.1	0.0	-0.1
Evictions (%)	0.8	1.0	1.9	1.7
Average monthly foreclosures (%)	8.9 *	7.6	11.2 *	8.1
Housing choice vouchers per 100 persons in poverty	2.7	3.2	4.6	5.3
Public housing units per 100 persons in poverty	-3.9	-2.9	-13.8 *	-11.5
Drug-related deaths per 100,000 persons	1.3 **	1.5 **	1.0 +	1.4 *
Opioid prescriptions per 100 persons	0.3	0.3	0.5 *	0.5 *
County fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	664	656	498	492
Number of counties	83	82	83	82

Coefficients have been transformed using the formula $(e^{(\gamma \times \beta)} - 1) \times 100$, where γ equals one, representing the percentage change in the number of homeless students for a one-unit change in each independent variable. Models estimated with robust standard errors clustered at the county level.

^a There is one less observation for literally homeless because one county had no students in that category across the study period.

+ p < 0.10 * p < 0.05 ** p < 0.01

Figure 1. Percentage of Students in Kindergarten through Twelfth Grade who were (1) Homeless, (2) Literally homeless, and (3) Doubled up, SY 2002–2003 to 2016–2017

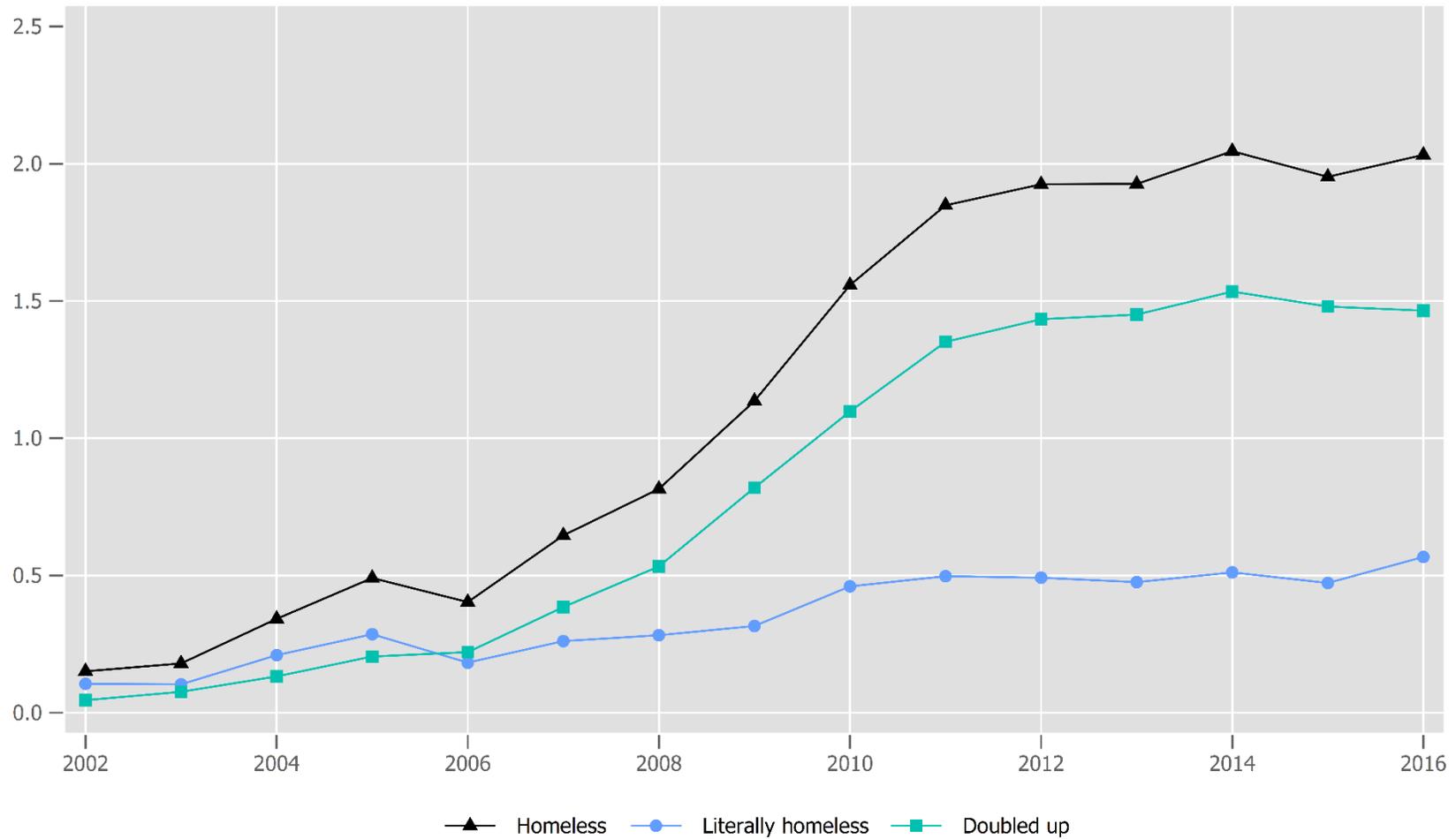
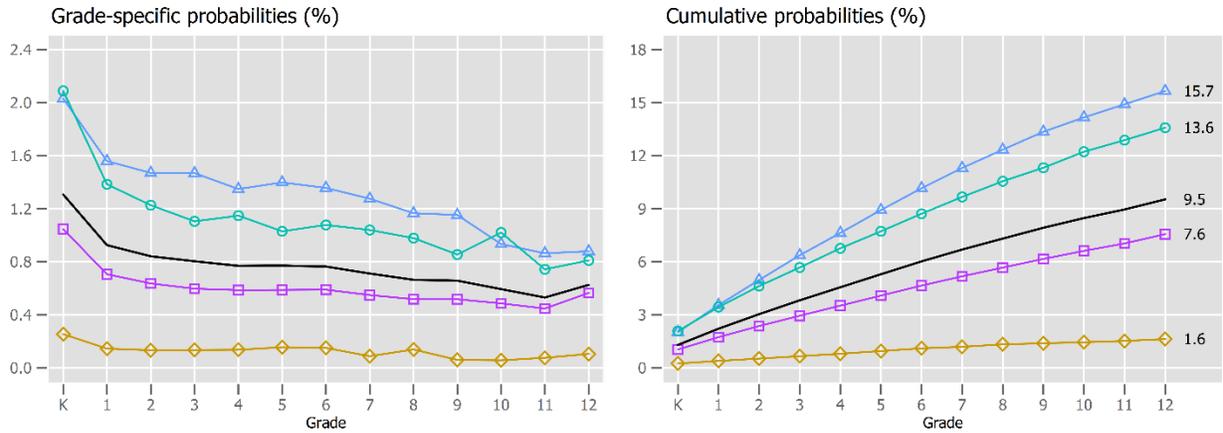
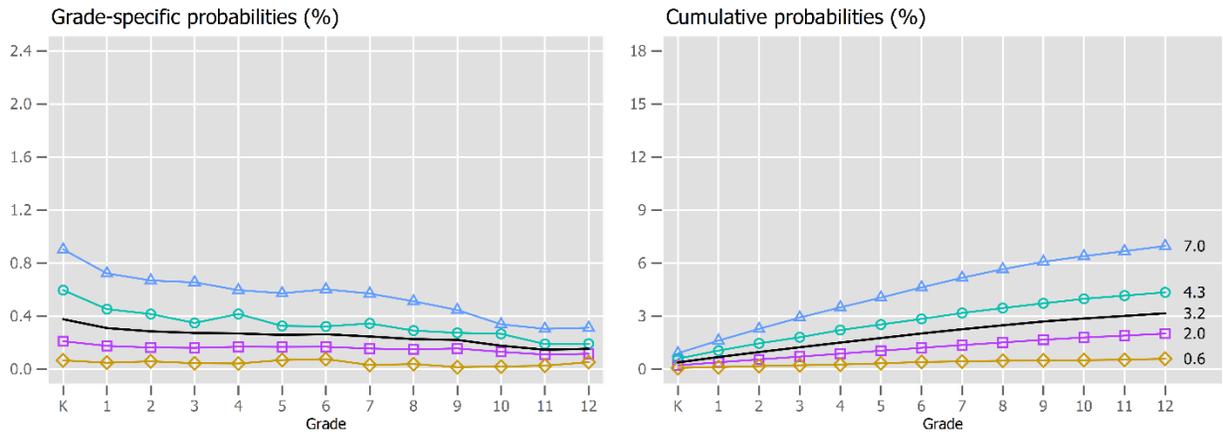


Figure 2. Probability of Being (1) Homeless, (2) Literally homeless, and (3) Doubled up, Stratified by Race and Ethnicity for SY 2002–2003 to 2016–2017

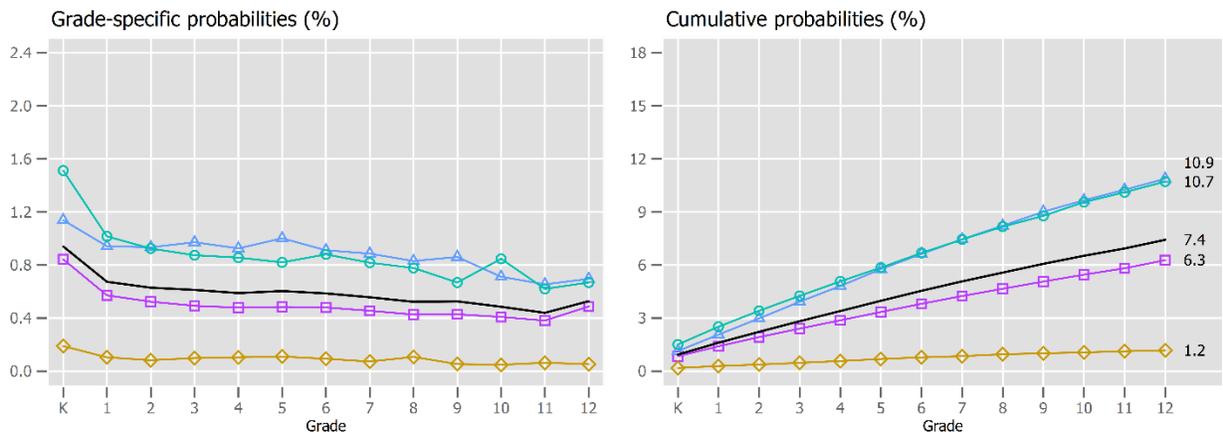
(1) Homeless (n=11,868,287)



(2) Literally homeless (n=12,107,009)



(3) Doubled up (n=11,963,336)



▲ Black
 ● Hispanic
 — Overall
 ◻ White
 ◇ Asian