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Are School Discipline Practices Pushing Students Out…to Another School?

A Longitudinal Analysis of School Transfers in Five Midwest Counties

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Abstract

Sociology of education scholars have positioned punitive discipline practices as factors that work to "push" unwanted students to drop out of school before graduating. However, limited research examines how punitive discipline practices may push students to transfer to another schools—potentially acting as a critical step in the process of pushing students out of the formal education system altogether. Using nine years student- and school-level data across five large counties in a Midwestern state we examined both (1) the impact of high school punishment on within-school year transfers through random effect panel regression models and (2) the ways in which this impact operates over time through survival models. Results demonstrate that punishment significantly increases the odds of transferring during the following school year, by 64% for in-school suspension and by 77% for out-of-school suspension. Data also suggest that Black students, students with IEPs, students qualifying for free lunch, and students in urban areas experience disproportionate rates of mobility. Our findings broaden the conceptualization of the pushout process, to now include students being pushed to transfer to another school, in addition to students being pushed to leave school entirely.

Keywords: student mobility, push-out theory, discipline practices, survival models

Are School Discipline Practices Pushing Students Out…to Another School?

A Longitudinal Analysis of School Transfers in Five Midwest Counties

Student mobility or students transferring from one school to another is a prevalent challenge faced by schools (Rumberger, 2003; Welsh, 2017) and is often a contributor to students prematurely leaving school altogether (Gasper et al., 2012; Rumberger & Larson, 1998; South et al., 2007; Stamp et al., 2022). In the existing literature, predictors of prematurely leaving high school are often viewed as an action taken, or initiated, by the student. Indeed, the implied subject of the phrase "drop out" is the student. However, this perspective can overlook the active role that schools may play in *pushing* students out who may be deemed as "undesirable" or "not fit for school" for a variety of reasons and through a multitude of mechanisms (Jabbari & Johnson, 2022). While there is an established relationship between student mobility and premature high school exit, there is limited research on how schools may actively contribute to pushing students to transfer. Therefore, we seek to deepen our understanding of this phenomenon through the lens of pushing out, examining how school contexts, particularly school discipline practices, may push high school students to transfer out…to another school.

Conceptual Framework

Sociologists of education have often considered the social and structural explanations of high school "dropout" (Fine, 1986; 1991), typically through a pushout framework. Specifically, Fine (1986) argues that examining individual causes of a student not graduating high school is inadequate and places blame on the students themselves rather than interrogating the social and structural factors within a school that contribute to high rates of students drop out, particularly for low-income, Black and, Latine students. Pushout factors have been described as experiences

within schools that compel youth to exit school prematurely (Jordan et al., 1996; Tuck, 2012). One of the most prominent pushout factors examined in the literature is exclusionary disciplinary practices (Jabbari & Johnson, 2022). Here, authors detail the ways in which schools can use punitive disciplinary practices to push students out of school who are labeled as "trouble-makers" (Bowditch, 1993), or who are perceived as "unworthy" of receiving education. Indeed, punitive disciplinary practices can be seen as a first step in a continuum of exclusion, starting with being excluded from classrooms (i.e., in-school suspension), to being excluded from schools (i.e., out-of-school suspension), and eventually from the education system altogether (i.e., dropping out).

However, pushing out—as a school-initiated—phenomena, does not necessarily involve a student dropping out of school altogether. Rather, a given school can be seen as "pushing" a student out of their school *and towards* another school. Given the established relationships between punishment and premature high school exit (Jabbari & Johnson, 2022), as well as between student mobility and premature high school exit (Gasper et al., 2012; Rumberger & Larson, 1998; Stamp et al., 2022), it is important to consider the relationship between punishment and transferring to another school. Furthermore, considering the disproportionate impact of student mobility and disciplinary practices on certain student groups, particularly Black males, this research may further identify the school factors contributing to these inequities. Such insights can provide sociologists with a more comprehensive understanding of the pushout phenomena, and also highlight the deleterious effects of school punishment to policy-makers and other stakeholders.

Taken together, we aim to build upon the existing literature to examine how school-initiated mobility, particularly through disciplinary practices, work to push students to transfer

and the long-term effects that follow. Leveraging longitudinal data across nine years and five large counties, we build upon the previous literature in three ways. First, we consider the impact of high school punishment on within-school-year transfers ("what") using random effect panel regression models. Additionally, we examine the ways in which this impact operates over time ("when") through survival models. Second, given the growing prevalence of in-school suspension—particularly as it relates to pushouts (Jabbari & Johnson, 2023; 2024), we consider both the impacts of in- and out-of-school suspension on student transfers. Lastly, we examine how these dynamics differ across urban and suburban/rural contexts, particularly considering the unique aspects of school choice in urban education, such as magnet and charter schools that do not entail residential school assignment. While considering a range of student- and school-level characteristics, we pose the following research questions:

1. How does punishment relate to within-year student transfers?
    a) How do these relationships differ across in- and out-of-school suspensions?
    b) How do these relationships vary across urban and suburban contexts?
2. How does punishment relate to within-year student transfers *over time*?
    a) How do these relationships differ across in- and out-of-school suspensions?
    b) How do these relationships vary across urban and suburban contexts?

Literature Review[1]

Push and Pull Factors of Student Mobility

Causes of student mobility can broadly be categorized by school-initiated or student/family-initiated and can be either voluntary or involuntary (Rumberger, 2015). For

[1] *Note*. This study is part of a larger project and paper series examining student mobility in St. Louis. Therefore, similar research has been summarized in related papers (Cohen et al., 2024; Jabbari et al., 2024; Terada et al., 2024; Wallace et al., 2024).

example, students and families may choose to enroll in a new school in an effort to improve their education or a student may be pushed to leave their school due to school-related factors such as school closures or disciplinary policies. Maroulis and colleagues (2019) examine "push" and "pull" factors that prompt students in New Orleans to leave one school and those that attract them to another. These researchers used state data from 2,399 school dyads (school senders and school receivers) in 2010-11 and 2011-12. Results demonstrate that academic performance functions as both "push" and "pull" factors. Specifically, underperforming schools pushed students away, while high-performing schools pulled or attracted these students towards their schools. Notably, the results also showed that the inclination to move from a low-performing school outweighs the desire to transfer to a high-performing one. Additionally, students with lower academic performance were more susceptible to being compelled to leave their underperforming schools, often without the opportunity to transition to a higher-performing alternative.

In another study, Rumberger and Thomas (2000) examined student and school factors that predict dropout and mobility rates in urban and suburban high schools in the U.S, using data from 247 urban and suburban high schools and 10th grade students. The authors found that when controlling for the effects of student characteristics, several school characteristics were associated with high student mobility. For example, schools with higher concentrations of students who have repeated a grade and students of color had higher mobility rates. Additionally, schools with higher teacher salaries and those in which students report higher quality teachers, had lower rates of student mobility.

Using data from the National Assessment of Education Progress, Rumberger (2003) highlighted the role of family background and neighborhood context in student mobility.

Specifically, Rumberger examined data from 133,489 students across 4th, 8th and 12th grade-levels in the U.S. and found that Black and Hispanic American 4th graders exhibited higher rates of unstructured mobility compared to their White and Asian American peers. Additionally, fourth-grade students from low socioeconomic status (SES) backgrounds were more likely to experience student mobility compared to those from middle- and high-SES backgrounds. Results also demonstrated higher mobility rates in urban districts predominantly comprised of Black students. Furthermore, Rumberger emphasized the role of family structure, noting that students from single-parent households were more likely to experience school transitions.

School policies and practices may also work to directly and indirectly push students to transfer (Rumberger, 2003). For example, policies around attendance and behavior, as well as school disciplinary practices, may lead to involuntary student transfers (Bowditch, 1993; Fine, 1991). While school discipline practices have been examined in the punishment literature as predictors of pushout (Stearns et al., 2007; Bowditch, 1993; Hirschfield, 2009), there is limited research on school discipline practices as a predictor of student mobility. Welsh (2019) examined the probability of a student making an unstructured and discipline-related school change, using data from the 2007-08 school year to the 2012-13 school year in a large urban district in Nevada (Clark County School District). Results showed that male students were more likely to move within-year in comparison to female students due to disciplinary incidents, particularly among middle school students. Further, Black, male, low-income, low achieving, and students receiving special education services, were disproportionately impacted by discipline-related moves. Welsh argues that these students are likely transferring to lower-achieving schools as a result, which may further perpetuate existing inequities.

Several other researchers have also identified student demographic groups that disproportionately experience mobility, particularly Black and low-income students (De la Torre & Gwynne, 2009; Kerbow, 1996; U.S. Government Accountability Office, 2010). For example, in the aforementioned studies, Black and Latine students had the highest rates of mobility (Min, 2022; Rumberger, 2003). This was also the case in a Chicago study conducted by De la Torre and Gwynne (2009); leveraging data from 1995-2007, the authors found that Black students had the highest mobility rates at both the elementary and high school level. The authors suggested that this disproportionate representation may be explained by Black students' higher rates of housing instability and residential mobility; the authors also note that Black students were more likely to attend lower achieving schools compared to their white and Asian peers (De la Torre & Gwynne, 2009). Disproportionate experiences with student mobility for low-income and Black families may also be explained by the well-documented unequal use of exclusionary disciplinary practices across racial groups (Welsh, 2019).

Student Mobility Timing, Types, and Outcomes

Prior research demonstrates that student mobility has considerable impacts on students' academic outcomes (Goldhaber et al., 2022; Reynolds et al., 2009; Schwartz et al., 2009; Welsh, 2017), however, the impact often depends on the *timing* and *type* of student mobility experienced (Rumberger, 2003; Chung & Delaney, 2024). For example, in a review of the research, Welsh (2017) states that while student mobility is generally associated with negative student outcomes, this was not always the case when transferring to a higher quality school. Specifically, *unstructured mobility or* transferring schools for reasons other than promotional moves (e.g., advancing from middle to high school) has been found to relate to both positive and negative impacts on academic outcomes, depending on the circumstance. For instance, Goldhaber and

colleagues (2022) identified the relationship between high student mobility and lower student achievement, as well as graduation rates. Reynolds and colleagues, (2009) found that when compared to students who had not experienced an unstructured move, having experienced three unstructured moves between kindergarten and high school was associated with significant declines in reading and math performance, as well as a decrease in graduation rates. Nevertheless, Schwartz and colleagues (2009) found that students who had experienced unstructured moves later in their academic trajectories experienced an increase in English and Language Arts (ELA) performance, particularly when families had made these moves strategically, to improve their child's educational outcomes.

Several scholars have identified a direct relationship between unstructured mobility and lower high school graduation rates. For example, in two studies that used national datasets, the authors found that while controlling for other predictors, students who made unstructured moves in high school were twice as likely to not finish high school in comparison to non-mobile students (Gasper et al., 2012; Rumberger & Larson, 1998). Specifically, they found that while the relationship between student mobility and later dropout can be partially explained by student characteristics, mobility is still significantly associated with a higher likelihood of later dropout.

In a more recent study, Stamp and colleagues (2022) found that unstructured mobility that occurred during the school year was associated with later dropout. However, outside of Stamp and colleagues (2022), much of the research on mobility and graduation does not distinguish transfers that occur within a school year from those that occur between school years. Importantly, within-school-year mobility aligns with the concept of pushing out, as this type of disruption is likely not a preferred outcome for families, whereas families may be more likely to seek out a different school during the summer months. Here, schools may be actively working to

remove a particular student from their school environment for a variety of reasons and through a multitude of mechanisms. Highlighting the role of the school context, researchers have also found that not only are mobile students less likely to graduate, but also that non-mobile students attending schools with high mobility rates have an increased risk of dropping out (South et al., 2007).

In a systematic review of the research, Welsh (2017) notes that much of the research examines student mobility through the lens of structured and/or unstructured mobility, often combining data on transfers that occur within and between school years. As a result, there is limited research on the timing of student transfers, and subsequently, few studies of within-school-year transfers. However, it is important to note that the research that does examine within-school year mobility demonstrates mostly negative outcomes (Engec, 2006; Grigg, 2012; Hanushek et al., 2004; Min, 2022). For example, Hanushek and colleagues (2004) found that students who transferred schools during the school year experienced significantly lower achievement gains, with the negative impact being twice as large compared to students who transferred at the beginning of the year. Additionally, they found that the negative impacts are also felt by non-mobile students. These authors also identified disproportionate impacts of with Black students and low-income students more likely to experience within-year mobility and experience the negative effects of a highly mobile school as non-mobile students.

In another study, Engec (2006) found that higher rates of student mobility within a school year was related to decreased academic performance and higher suspension rates. Moreover, Grigg (2012) differentiated between student transfers within and between school years and whether the move was compulsory or not. He found negative impacts on student achievement across all types of mobility. However, students who experienced compulsory moves

within the school year (ex. behavioral expulsion) experienced more negative impacts on achievement in math and reading in comparison to between-year compulsory moves (ex. promotional moves). Moves that were within the school year but noncompulsory (ex. residential mobility) were not significantly different from between year estimates.

In a more recent study, Min (2022) found that within-school-year mobility correlated with diminished academic performance compared to between-school-year mobility. Furthermore, Min observed that the effects of within-year mobility varied among different racial groups, whereas between-year mobility did not exhibit such variations. In particular, Asian students, despite demonstrating higher levels of proficiency in reading and math, experienced more pronounced negative impacts from within-year school mobility compared to other demographic groups. Concurrently, Black students had the highest rates of mobility across both types. While research examining the impact of within-school-year mobility is growing, limited research exists that identifies school and student predictors of within-school year mobility. In the next section, we review the research on student- and school-level predictors of school mobility.

Methods[2]

Data and Sample

Student- and school-level data for our empirical analysis comes from the Missouri Department of Elementary and Secondary Education (DESE). The student-level enrollment and core demographic data were collected from the 2010-2011 through the 2018-2019 school years. The student-level sample in the datasets includes complete records for any student from 9th through 12th grades who attended a public school (including a public charter school) in one of the

[2] Data was collected for this study as part of a larger project on student mobility in St. Louis. Thus, the description of data collection, sample, and variables are methods section in this study is based on our first paper (Terada et al., 2024). The analytical approach is nearly identical to Wallace et al., (2024.) which explores the relationship between student achievement and mobility among 3rd-8th grade students.

five St. Louis area counties throughout the study period: St. Louis City, St. Louis County, and three surrounding counties: St. Charles County, Franklin County, and Jefferson County. Student-level data was then merged with publicly available school-level assessment and discipline data from the DESE. The school assessment file included the number of students for each achievement level in state ELA and math assessments, while the school discipline file included the average number of incidents in student discipline.

Based on our focus on unstructured moves to other schools occurring during the school year from 9th to 12th grades, a small proportion of observations were removed through listwise deletion. Specifically, we removed summer school records, records in which entry dates are the same as the exit dates ("no shows"), records in which the exit code is stop-out, drop-out, or deceased, and records that we were not able to match with school-level data (e.g., for students that attended a school that was closed in 2018-2019). We also removed students who repeated any of the same grades for two or more years and who did not have reported test scores in 8th grade. A visual depiction of our data cleaning process can be found in Appendix A. The final analytical sample includes 91,680 students (366,720 student-level records), 6,855 (27,420 records) for St. Louis City County, and 79,657 (318,628 records) for four counties across 9 school years. While our five-county analysis allows us to understand student mobility across an entire metropolitan region, we also include subsample analyses of St. Louis City and the surrounding four counties to explore how mobility dynamics may vary across urban and suburban contexts.

Analytic Approach

Regression Modeling

For our first analysis, we utilized random-effect panel logistic regression models for dichotomous outcomes. Unlike fixed-effect models, random effect models allow us to estimate the effects of time-invariant characteristics, like student race and ethnicity, which—given the prior literature—are key variables of interest in the relationship between punishment and mobility. One of the challenges in predicting within-year transfers is temporality. As our data does not allow us to "time-stamp" our key predictor—punishment, we use student- and school-level variables in a given school year to predict whether a student transfers to a different school in the following school year. This allows us to ensure that punishment comes before mobility. For example, when we predict whether a student transfers in his/her 10th grade, we use student- and school-level characteristics of the student in his/her 9th grade. Because our datasets include 9th through 12th grades, student- and school-level predictors in the 12th grade are not included in the analysis; only the outcome variable in the 12th grade is included. For our examination of whether or not students transfer, we apply the following logistic regression models:

$$\ln\left(\frac{p_{i\in s,t}}{1-p_{i\in s,t}}\right) = X_{i,t-1}^{ind}\mathrm{B} + X_{s,t-1}^{sch}\mathrm{B} + \varepsilon_{i,t} \quad (1)$$

where $p_{i\in s,t}$ is the probability of transferring of student i in school s at time t, $X_{i,t-1}^{ind}$ is a vector of individual student i's variables at a school year before the transfer $(t-1)$, $\mathrm{X}_{\mathrm{s,t-1}}^{\mathrm{sch}}$ is a vector of school-level variables of student i's school s at a year before the transfer $(t-1)$, and $\varepsilon_{i,t}$ is the error term. To aid interpretation, our results are reported in odds ratios.

Survival Modeling

Our second analysis focuses on *when* a student transfers to a different school. To answer this question, we utilized a survival model (Cox, 1972), which can not only be applied to a single

occurrence of an event but also to repeated events within individuals (Bahr, 2009). In our survival analysis, we applied the Cox proportional-hazard model (Amorim & Cai, 2015). The Cox proportional-hazard model can be used to examine whether the hazard or survival functions (e.g., time-to-event) differ between- and within-individuals. In particular, when these functions focus on between-individual differences, the Cox proportional-hazard model is typically used (Cox, 1972; Lougheed et al., 2019). The Cox proportional hazards can be estimated as follows:

$$h_{ij}(t) = h_0(t)\ exp(X^{ind}_{i,t=9}\mathrm{B} + X^{sch}_{s,t=9}\mathrm{B}) \quad (2)$$

where *t* represents the survival time, $h_{ij}(t)$ is the hazard function of the *j*th event at time interval *t* in individual student *i*, $X^{ind}_{i,t=9}$ is a vector of individual student *i*'s characteristics in the 9th grade, $X^{sch}_{s,t=9}$ is a vector of school characteristics of student *i*'s school *s*, the coefficient B, represent the impact of student- and school level characteristics in the 9th grade, and $h_0(t)$ is the baseline hazard that corresponds to the value of the hazard if all the predictors are zero.

We examined the association between student transfers across school years (i.e., when a student transfers to a different school) and student- and school-level characteristics in the 9th grade (i.e., student records and school information when a student was in the 9th grade), with the exception of academic achievement, which was captured in 8th grade. In particular, our model is used to examine how student- and school-level characteristics in the 9th grade influence the ratios of student transfers—their "survival" rate—at a specific time point.

Measures

Dependent Variables

For both the first and second analyses, we constructed a dichotomous outcome variable by dividing students' exit status into two categories (0 = remain in the school during a school year; and 1 = transfer to another school once or more during a school year). In particular, our survival analysis focused on the first event of transfers. Once a student transferred to a different school, the student was removed from our survival analytic pool. For example, when a student transferred to a different school in his/her first year, the student was removed from the survival analytic pool for remaining years, such that their second transfer (if applicable) was not analyzed. Here, we focus on how long students "survive" in school before their first transfer.

Independent Variables

Our analysis involves examining the associations between student- and school-level characteristics and unstructured transfers occurring during the school year. Student-level characteristics include: school year, grade level (ranging from 9^{th} through 12^{th} grades), race/ethnicity (White, Black, Hispanic, Asian, and others), gender (female and male), lunch status (free, reduced-, and regular-priced), special education status (student with and without an IEP), English language learner status (ELL and non-ELL), homeless status (homeless and not homeless), residency status (resident in the attending school district, not a resident in the attending school district), charter school attendance (attending a charter school student and not attending a charter school student), achievement levels in state-level assessment in math and ELL in their 8^{th} grade (below-basic, basic, proficient, and advanced), and in-school and out-of-school suspensions (suspended and not suspended). Additionally, school-level characteristics include the numbers of enrolled students, percentages of each race/ethnicity group (Black, Hispanic, and others), percentages of free/reduced lunch students, percentages of special education students, percentages of students with proficient or advanced levels in state-level math

and ELA assessments in their 8th grade, rates of in-school suspension, and rates of out-of-school suspension[3][4]. For the unit of measures, we re-scaled school-level variables to obtain more manageable coefficients for ease of interpretation. Specifically, we divided the numbers of enrolled students by one hundred and the rest of the variables by ten.

Results

Sample Description

Table 1 presents descriptive statistics for the entire sample. On average, over 95.53% of students remained in their respective schools and 4.47% of students transferred to another school during the school year. For the suspension, 88.22% of students did not get any in-school suspensions and 11.78% got an in-school suspension at least once. 93.37% did not get any out-of-school suspension and 6.63% got an out-of-school suspension at least once. For achievement levels in the state assessments in the 8th grade, 49.65% of students performed at proficient or advanced levels and 50.35% performed at below-basic or basic levels in the math assessment. In the ELA assessment, 53.69% of students performed at proficient or advanced levels and 46.31% performed at below-basic or basic levels. For gender, 49.71% were male students and 50.29% were female students. For race/ethnicity, 60.13% were white students, 28.92% were Black students, 2.55% were Hispanic students, and 2.44% were Asian students. 59.07% of students did not qualify for free or reduced price lunch, 36.17% of students qualified for free lunch, and 4.77% of students qualified for reduced price lunch. 13.61% of students qualified for special education services and about 8.65% of students were designated as English language learners

[3] Rates are calculated as the total number of suspension occurrence per 100 students.
[4] Here, it is important to note that some school-level variables were subject to "blinding" due to very low numbers. For example, if a statistic was derived from less than 10 students, the Missouri Department of Elementary and Secondary Education coded it as missing. Not wanting to further limit the sample, we recoded these statistics as 0, due to their small size.

(ELL). 96.85% of students were not homeless and 3.15% of students were homeless. 96.61% of students resided in their school's catchment area. 99.26% of students did not go to charter schools while 0.74% of students went to charter schools.

Descriptive statistics for St. Louis City and the other four counties can be found in Appendix B. Here, it is important to note that some of the sample characteristics in St. Louis City were notably different from the surrounding counties. For example, the percentage of students who transferred during the school years was higher (6.97%) in St. Louis City than the surrounding four counties (4.47%). Furthermore, the percentage of suspensions was higher in both in-school (20.72%) and out-of-school (14.56%) in St. Louis City than in the surrounding four counties (11.78% in in-school; 6.63% in out-of-school suspension). Moreover, the percentages of students with below-basic or basic levels in the state assessments in the 8th grade were much higher in both math (74.40%) and ELA (70.42%) in St. Louis City than the surrounding four counties (47.03% in math and 43.17% in ELA). Additionally, the percentage of Black students was much higher (81.17%) in St. Louis City than the surrounding four counties (24.01%). Finally, the percentage of students who qualified for free lunch was also much higher (88.71%) in St. Louis City than the other four counties (29.72%)[5].

Panel Regression Analyses

Table 2 examined the association between student transfers and student-level characteristics (Models 1 and 2) and student- and school-level characteristics (Models 3 and 4) to answer our first research question, whether a student transfers to a different school. Models 1 and 3 incorporated in-school suspension and Models 2 and 4 incorporated out-of-school suspension. Starting with school years in Model 3, when compared to the school year of 2010-2011, all other

[5] This estimate could be inflated due to Community Eligibility Provisions, which categorizes all students in a given school as FRPL-eligible after a certain threshold of students are directly eligible.

school years were significantly associated with a moderate decrease in the odds of transfers. For all other variables, we use a coefficient plot to visualize the odds of being associated with transfers (Figures 1 and 2). Beginning with student variables, the following factors were significantly associated with increased odds of transferring: students with in-school-suspensions (OR=1.639***)—when compared to non-suspended students, students in 10th grade (OR=1.872***) and 11th grade (OR=1.123***)—when compared to students in 9th grade, Black students (OR=1.199***)—when compared to white students, students who qualified for free (OR=2.029***) and reduced price lunch (OR=1.773***)—when compared to full-price lunch, students not residing in their school's catchment area (OR=1.653***)—when compared to students residing in their school's catchment area, and students with IEPs (OR=1.750***)—when compared to students without IEPs. Conversely, students performing at a proficient (OR=0.689***) and an advanced level in 8th grade math (OR=0.391***)—when compared to students performing at a below basic level in 8th grade math, students performing at a proficient (OR=0.692***) and an advanced level in 8th grade ELA (OR=0.479***)—when compared to students performing at a below basic level in 8th grade ELA, ELL students (0.739***)—when compared to non-ELL students, and students attending charter school students (OR=0.531***)—when compared to students not attending charter school students, were significantly associated with decreased odds of transfers.

Moving on to school-level variables, a one-unit increase in the percent of Black students (OR=1.052***), the percent of Hispanic students (OR=1.152*), the percent of other race/ethnicity students (OR=1.697***), was significantly associated with increased odds of transfers, while a one-unit increase in the number of enrolled students (OR=0.986***), ELL students (OR=0.836***), and the percent of 8th grade students who reached proficient or

advanced levels in the math assessments (OR=0.486***), was significantly associated with decreased odds of transfers. For out-of-school suspension (Model 4), the odds associated with transferring (OR=1.77***) were slightly larger than in-school suspension. Similar results were observed for other student- and school-level characteristics.

Subsample analyses for St. Louis City and the other four counties can be found in Appendix C. We observe both similarities and differences between St. Louis City (Table C1, Figures C1 and C2) the surrounding four counties (Tables C2 and Figures C3 and C4). Most notably, the effect of in-school suspension and out-of-school suspension in particular, on the odds of transferring, were larger in St. Louis City (ISS: OR=1.793***; OSS: OR=2.480***) than the surrounding four counties (ISS: OR=1.554***; OSS: OR=1.594***). Additionally, in the St. Louis City in-school suspension model, performance at an advanced level in math and ELA 8th grade assessments, being a Black student, qualifying for a free or reduced price lunch, receiving special education services, and attending a charter school were factors that were not significantly associated with transferring. Finally, at the school level, the number of enrolled students and percentages of Hispanic students were not significantly associated with the odds of transferring in St. Louis City, while a one-unit increase in the percent of special education students was significantly associated with increased odds of transferring in St. Louis City (OR=1.328***).

Survival Analyses

Table 3 presents the results of the Cox proportional hazards estimates of student transfers. Similar to our regression analyses, Models 1 and 2 include student-level characteristics and Models 3 and 4 include student- and school-level characteristics; Models 1 and 3 included in-school suspension and Models 2 and 4 included out-of-school suspension. In the in-school suspension model (Model 3) shown in Figure 3, we observe that students with no in-school

suspensions in 9th grade experience a significantly lower risk of transferring to a different school throughout high school ($p < 0.001$) than students with in-school suspensions. Here, the risk accumulates each year, such that by 12th grade approximately 88% of the students with no in-school suspensions remained in their school of origin, whereas roughly 82% of students with an in-school suspensions in 9th grade remained in their school of origin. In both cases, the largest differences occurred in senior year, representing an accumulation effect. Similarly, in Figure 4, we see that students with no out-of-school suspensions in 9th grade experience a significantly lower risk of transferring to a different school throughout high school ($p < 0.001$) than students with out-of-school suspensions. Again, the risk accumulates each year, such that by 12th grade approximately 86% of the students with no out-of-school suspensions remained in their school of origin, whereas roughly 78% of students with an out-of-school suspension in 9th grade remained in their school of origin.

Subsample analyses for St. Louis City and the other four counties can be found in Appendix D (St. Louis City: Table D1, Figures D1 and D2; Surrounding Counties: Table D2, Figures D3 and D4). For both in- and out-of-school suspension, the differences between suspended and non-suspended students were largest in St. Louis City. For example, in St. Louis City, approximately 79% of the students with no in-school suspensions remained in their school of origin, whereas roughly 66% of students with an in-school suspension in 9th grade remained in their school of origin. However, in the surrounding four counties approximately 88% of the students with no in-school suspensions remained in their school of origin, whereas roughly 83% of students with an in-school suspension in 9th grade remained in their school of origin. Moreover, in St. Louis City in St. Louis City, approximately 80% of the students with no out-of-school suspensions remained in their school of origin, whereas roughly 59% of students with an

out-of-school suspension in 9th grade remained in their school of origin. Nevertheless, in the surrounding four counties, approximately 88% of the students with no out-of-school suspensions remained in their school of origin, whereas roughly 81% of students with an out-of-school suspension in 9th grade remained in their school of origin.

Discussion

Much of the research on pushing out—the process by which schools push students out of their buildings, focuses on the relationship between punishment and exiting high school before graduating (Bowditch, 1993; Jabbari & Johnson, 2023; 2024). However, if the underlying motivation is for schools to "get rid of their (perceived) troublemakers", then it is technically not necessary for students to drop out of school altogether. Rather, schools can accomplish their goals simply by pushing students out of their school and towards another school. In other words, students can be *pushed to transfer*, and in doing so, become "someone else's problem". Given what we know about the strong relationship between transferring and dropping out of school, being pushed out of one school and towards another may represent an important piece of the larger process by which students are pushed out of the education system altogether.

In this study, we explore if the process of pushing out is, indeed, broader than what the literature often considers by examining the relationship between exclusionary discipline and within-year transfers. Leveraging longitudinal data across nine years and five large counties in Missouri, we build upon the previous literature in three ways. First, we consider both the impact of high school punishment on within-year transfers through random effect panel regression analyses *and* the ways in which this impact operates over time through survival analyses. Second, given the growing prevalence of in-school suspension—particularly as it relates to pushouts (Jabbari & Johnson, 2023; 2024), we consider the impacts of both in- *and* out-of-school

suspension on within-year transfers. Finally, given the unique context of school choice in urban areas—with school options that do not require residential assignment, we examine how the relationships between punishment and transferring differ across urban and suburban/rural contexts.

Findings

To align with pushout literature, we focus on students leaving school *during* the school year, which often resembles a "forced" or involuntary move, as opposed to a move in the summer in which families may be seeking out alternative learning environments for their children. Starting with our random effect panel regression analyses, we find that being suspended in-school was associated with a 64% increase in the odds of transferring during the following school year. Not surprisingly, out-of-school suspension had an even greater association with transferring—a 77% increase in the odds. While the year lag ensures temporality, it can also be seen as a conservative estimate, as it is likely that many of these students were also suspended the year of the transfer, which might have an even stronger effect on transferring. Indeed, the literature shows that one of the strongest predictors of future punishment is past punishment (Jabbari & Johnson, 2022; 2024). It is also worth noting that attending a school with a larger number of suspensions was associated with increased odds of transferring—net of actually receiving a suspension. In line with previous research (Jabbari & Johnson, 2023), this finding represents the collateral effects of attending a high suspending school.

Our random effect panel regression analyses also allow us to understand the influence of a variety of student and school characteristics beyond punishment. In line with the previous research demonstrating the relationship between low academic performance and being pushed out (Stearns & Glennie, 2006), we found that low academic performance was strongly associated

with transferring. We also found large disparities in terms of race and social class: Black students experienced a 20% increase in the odds of transferring and, most strikingly, students who qualified for free lunch, experienced a 102% increase in the odds of transferring. This finding regarding the race gap aligns with prior research (De la Torre & Gwynne, 2009) and suggests Black students may be susceptible to being pushed out. Additionally, students who qualify for free lunch may face other economic barriers at home, such as eviction that cause them to transfer. We also found that students with IEPs were also more likely to transfer: as they often have a label attached to their identity, they may be more susceptible to stigma (Shifrer, 2013) and being pushed out as well (Cruz & Myers, 2024). At the same time, certain policies may make it easier for students to transfer, potentially seeking better learning opportunities elsewhere. For example, students not residing in a school's catchment area were more likely to transfer. Nevertheless, students who attended charter schools were less likely to transfer, perhaps because parents had "chosen" these schools for their children.

We also notice differences across geographic contexts. Across both in- and out-of-school suspension models, we observed substantially larger effects in St. Louis City. With a greater share of students that are typically pushed out, such as Black and low-income students, it is possible that trends in St. Louis City are representative of larger urban inequalities. Indeed, research has demonstrated that Black students—especially Black males—are more likely to be pushed out for disciplinary reasons (Stearns & Glennie, 2006). At the same time, while there were small differences in the relationship between in- and out-of-school suspension in the surrounding counties, there were large differences in St. Louis City. The influence of out-of-school suspension was nearly twice that of in-school suspension in St. Louis City. Here, the severity of out-of-school suspension could lead to different forms of labeling and other stigma

that manifest in particularly salient ways in urban areas. Alternatively, urban schools may be less equipped to support students returning from out-of-school suspension, which may make transferring to another school one of the only viable options left.

Additionally, it is important to note that although adding school characteristics to our analysis helps us determine if schools mediate the influence of suspension on transferring, we only observe small decreases in the influence of suspension. It is also worth noting that the variation explained does not substantially change when we include school characteristics, suggesting that school environments are less important in this phenomenon, which is largely explained by student experiences (e.g., being suspended) and characteristics.

Finally, we examine our findings from our survival models. For in-school suspension, we find that the effect of early punishment—in 9th grade—is cumulative, such that by 12th grade, only 82% of suspended students remain in their school of origin, compared to 88% of non-suspended students. The findings were more drastic for out-of-school suspension—only 78% of suspended students remained at their school of origin. Similar to our panel regression results, the impacts were much larger in St. Louis city: only 66% of students who received an in-school suspension remained in their school of origin by 12th grade, and only 59% of students who received an out-of-school suspension remained in their school of origin by 12th grade. Again, the consequences of being suspended and the prevalence of being pushed out are far greater in St. Louis City, suggesting that urban dynamics can intensify this phenomenon for students, potentially putting already vulnerable students at greater risk.

Implications

Our findings have implications for theory, methods, policy, and practice. Theoretically, our findings broaden the conceptualization of "pushing out." While it is true that schools use

punishment to push some students out of the education system altogether, our findings demonstrate that this is not the only mechanism, nor the entire process. Rather, schools may also be pushing students out of their schools and towards other schools. Given the strong relationships with transferring schools and dropping out, our findings also suggest that being pushed out of one school and towards another might be the first step in being pushed out of the education system altogether. Future research should explore the longitudinal relationship between being punished, transferring, and dropping out to get a more comprehensive understanding of this phenomenon.

Regarding methods, our findings demonstrate that it is important to examine the effect of heterogeneity in this context—particularly as it relates to geography. Indeed, it was not only the prevalence of punishment and within-year transfers that differed across contexts, but also their relationship. This was especially prevalent in our survival analysis, which demonstrated substantially different survival rates of suspended and non-suspended students across urban and suburban/rural areas. Survival analyses, in general, proved to be a useful tool in examining the process of pushing out in our study, as it allowed us to understand the cumulative effects of prior punishment in ways that other models could not.

Concerning policies, our findings demonstrate that while the effects of out-of-school suspension on transferring were often larger, the effects of in-school-suspension were still significant and substantial. Despite being viewed as a “healthy alternative” to out-of-school suspension, in-school suspension appears to be a significant contributor in the process by which schools push students out. As noted by Jabbari and Johnson (2020) in-school suspension may indeed need its own alternative. In this regard, policy-makers should consider policies and practices rooted in restorative justice. Rather than separating students from their classroom

communities, restorative justice seeks to reintegrate them—and do it in a way that repairs previous harms and builds relationships (Gonzalez, 2012). Restorative justice also increases students' sense of belonging and engagement, which can limit future offenses—and subsequent punishments—altogether (Eisenberg, 2016). Indeed, restorative justice practices can increase group solidarity, as well as emotional energy (Marcucci, 2021). Sense of belonging, engagement, group solidarity, and emotional energy may be especially important for students who are at risk of transferring.

In addition to the role of punishment, our findings highlight a variety of risk factors across contexts that can be used to support students most in need. For example, given the importance of homelessness in predicting within-year transfers, schools may want to consider additional ways to support unhoused students. One of the school districts in St. Louis County, Maplewood Richmond Heights, established "Joe's Place" in 2006 to "offer unhoused students in the [district] a caring home environment that supports them for high school graduation, self-sufficiency, and positive transitions into their adult lives" ("Joe's Place", 2024). Moreover, given the impact of poverty—as approximated by free and reduced price lunch status in our models, broader policies should be pursued to provide low-income families with financial resources to reduce the effect of housing shocks (e.g., eviction). In this regard, expanded Child Tax Credits, which recently demonstrated a marginal reduction in evictions (Hamilton et al., 2022), could be pursued. Finally, given the large proportion of between-district transfers found in a similar sample of students (Terada et al., 2024), districts may want to consider developing mechanisms to share relevant academic information for students that do transfer.

Limitations

Despite the contributions of this study, it is not without its limitations. Concerning external validity, while this study encompasses students from over five large counties, the dynamics around both punishment and mobility may differ in other parts of the country. Future research should explore these dynamics nationally, potentially leveraging federal survey data, such as the High School Longitudinal Study (HSLS). Concerning internal validity, while our random effect panel regression models leverage repeated observations and a host of observed characteristics at both the student and the school level to provide strong inferences, we cannot rule out the possibility of selection bias associated with punishment. Future research should consider exogenous sources of variation, such as policy changes in punishment practices, that can help establish causal claims. Specificity of event timing is also a limitation in this study. While we prioritize temporality and thus focus on punishment in the year prior to within-year transfers, future research should explore data in which both the timing of the punishment event and the timing of the transfer event can be specified with an exact date.

Conclusion

Exclusionary discipline practices are not isolated events, but rather occurrences that can place students on trajectories of intensifying exclusion, beginning with being excluded from classrooms (in-school suspension), moving onto being excluded from school (out-of-school suspension), followed by being excluded from the education system (dropping out), and, finally, for some students, ending with being excluded from society altogether (incarceration) (Jabbari & Johnson, 2022). However, there is an additional form of exclusion: from one's school of origin—the place where students have made a home for themselves, with routines, peers, and activities. This can be especially true in high school, given the array of social activities. Indeed, students often spend more time in school then they do at home.

While it is true that students transfer for a variety of reasons, we demonstrate the immediate *and* cumulative effects of exclusionary discipline practices on student transfers. In doing so, we broaden the conceptualization of the pushout process, while demonstrating an important, yet overlooked element: being pushed to transfer to another school. Students who are pushed to another school tend to experience greater rates of punishment, lower achievement, and frequently exit the education system entirely (Jabbari & Johnson, 2022). Thus, while some schools may view these students as "someone else's problem", a broader understanding of collective responsibility is needed. Students who stay in school and graduate pay more in taxes, commit fewer crimes (Belfield & Levin, 2007), volunteer more (White, 2006), and even vote more (Flanagan & Levine, 2010). Thus, being pushed out of one school and towards another is not an individual student's problem nor is it another school's problem; rather it is *our* problem.

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Table 1

Results of descriptive statistics for five counties

Student-level variables	Category	9th grade		10th grade		11th grade		12th grade		Total (366,720)	
		N/Mean	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**
Transfer	Non-transfer	88415	96.44%	87350	95.28%	85381	93.13%	87372	95.30%	348518	95.04%
	Transfer	3265	3.56%	4330	4.72%	6299	6.87%	4308	4.70%	18202	4.96%
School year	2011	16971	18.51%	0	0.00%	0	0.00%	0	0.00%	16971	4.63%
	2012	16927	18.46%	16971	18.51%	0	0.00%	0	0.00%	33898	9.24%
	2013	17393	18.97%	16927	18.46%	16971	18.51%	0	0.00%	51291	13.99%
	2014	13157	14.35%	17393	18.97%	16927	18.46%	16971	18.51%	64448	17.57%
	2015	13285	14.49%	13157	14.35%	17393	18.97%	16927	18.46%	60762	16.57%
	2016	13947	15.21%	13285	14.49%	13157	14.35%	17393	18.97%	57782	15.76%
	2017	0	0.00%	13947	15.21%	13285	14.49%	13157	14.35%	40389	11.01%
	2018	0	0.00%	0	0.00%	13947	15.21%	13285	14.49%	27232	7.43%
	2019	0	0.00%	0	0.00%	0	0.00%	13947	15.21%	13947	3.80%
In-school suspension	No	79522	86.74%	79170	86.35%	79565	86.79%	81221	88.59%	319478	87.12%
	Yes	12158	13.26%	12510	13.65%	12115	13.21%	10459	11.41%	47242	12.88%
Out-of-school suspension	No	84042	91.67%	84150	91.79%	84743	92.43%	86410	94.25%	339345	92.54%
	Yes	7638	8.33%	7530	8.21%	6937	7.57%	5270	5.75%	27375	7.46%
Math proficiency in the 8th grade	Below basic	15607	17.02%	15607	17.02%	15607	17.02%	15607	17.02%	62428	17.02%
	Basic	30559	33.33%	30559	33.33%	30559	33.33%	30559	33.33%	122236	33.33%
	Proficient	27729	30.25%	27729	30.25%	27729	30.25%	27729	30.25%	110916	30.25%
	Advanced	17785	19.40%	17785	19.40%	17785	19.40%	17785	19.40%	71140	19.40%
ELA proficiency in the 8th grade	Below basic	5069	5.53%	5069	5.53%	5069	5.53%	5069	5.53%	20276	5.53%
	Basic	37385	40.78%	37385	40.78%	37385	40.78%	37385	40.78%	149540	40.78%
	Proficient	32815	35.79%	32815	35.79%	32815	35.79%	32815	35.79%	131260	35.79%
	Advanced	16411	17.90%	16411	17.90%	16411	17.90%	16411	17.90%	65644	17.90%
Gender	Female	46118	50.30%	46109	50.29%	46104	50.29%	46103	50.29%	184434	50.29%
	Male	45562	49.70%	45571	49.71%	45576	49.71%	45577	49.71%	182286	49.71%
Race/Ethnicity	White	58936	64.28%	58822	64.16%	58742	64.07%	58683	64.01%	235183	64.13%
	Asian	2240	2.44%	2233	2.44%	2228	2.43%	2232	2.43%	8933	2.44%
	Black	26562	28.97%	26512	28.92%	26506	28.91%	26481	28.88%	106061	28.92%
	Hispanic	2280	2.49%	2327	2.54%	2372	2.59%	2386	2.60%	9365	2.55%
	Others	1662	1.81%	1786	1.95%	1832	2.00%	1898	2.07%	7178	1.96%

	Unreduced lunch	53188	58.01%	53763	58.64%	54545	59.50%	55118	60.12%	216614	59.07%
Lunch status	Free lunch	33301	36.32%	33323	36.35%	32980	35.97%	33025	36.02%	132629	36.17%
	Reduced lunch	5191	5.66%	4594	5.01%	4155	4.53%	3537	3.86%	17477	4.77%
Homelessness	Not Homeless	89513	97.64%	89226	97.32%	88750	96.80%	87688	95.65%	355177	96.85%
	Homeless	2167	2.36%	2454	2.68%	2930	3.20%	3992	4.35%	11543	3.15%
ELL status	Not ELL	79980	87.24%	83765	91.37%	85454	93.21%	85800	93.59%	334999	91.35%
	ELL	11700	12.76%	7915	8.63%	6226	6.79%	5880	6.41%	31721	8.65%
IEP	Not IEP	78819	85.97%	78989	86.16%	79268	86.46%	79740	86.98%	316816	86.39%
	IEP	12861	14.03%	12691	13.84%	12412	13.54%	11940	13.02%	49904	13.61%
Residency	Resident in the attending district	88517	96.55%	88562	96.60%	88602	96.64%	88611	96.65%	354292	96.61%
	Others	3163	3.45%	3118	3.40%	3078	3.36%	3069	3.35%	12428	3.39%
Charter school	Not charter school	90898	99.15%	90998	99.26%	91044	99.31%	91058	99.32%	363998	99.26%
	Charter school	782	0.85%	682	0.74%	636	0.69%	622	0.68%	2722	0.74%
School-level variables											
Number of enrolled students		1393.55	574.12	1385.38	567.82	1371.59	564.62	1360.54	560.89	1377.76	567.02
Percentage of Black students		27.59	33.10	27.43	32.97	27.51	33.09	27.62	33.26	27.54	33.11
Percentage of Hispanic students		2.48	2.18	2.69	2.36	2.93	2.56	3.19	2.76	2.82	2.49
Percentage of White students		65.53	32.65	65.19	32.50	64.64	32.49	63.95	32.54	64.83	32.55
Percentage of other race/ethnicity		4.40	3.76	4.69	3.83	4.93	3.95	5.23	4.09	4.81	3.92
Percentage of free/reduced lunch		38.05	26.37	38.83	27.44	39.57	28.67	40.16	30.04	39.15	28.17
Percentage of ELL students		1.15	2.44	1.21	2.57	1.33	2.84	1.47	3.20	1.29	2.78
Percentage of special education students		13.68	5.68	13.43	6.24	13.32	6.44	13.33	5.95	13.44	6.09
Rate of in-school suspension		0.40	1.50	0.38	1.52	0.38	1.64	0.32	1.21	0.37	1.47
Rate of out-of-school suspension		3.70	4.06	3.27	3.72	3.05	3.39	3.01	3.46	3.26	3.68
Percentage of 8th grade students with math proficient/advanced levels		46.77	20.31	46.77	20.31	46.77	20.31	46.77	20.31	46.77	20.31
Percentage of 8th grade students with ELA proficient/advanced levels		51.00	18.70	51.00	18.70	51.00	18.70	51.00	18.70	51.00	18.70

Table 2

Results of panel regression for five counties

	Model 1	Model 2	Model 3	Model 4
In-school suspension (reference=No suspension)				
In-school suspension	1.646***		1.639***	
	(0.0482)		(0.0481)	
Out-of-school suspension (reference=No suspension)				
Out-of-school suspension		1.788***		1.770***
		(0.0604)		(0.0601)
8th grade MA assessment (reference=below basic level)				
Basic	0.913*	0.919*	0.938	0.943
	(0.0377)	(0.0379)	(0.0390)	(0.0392)
Proficient	0.671***	0.672***	0.689***	0.690***
	(0.0341)	(0.0341)	(0.0361)	(0.0361)
Advanced	0.389***	0.386***	0.391***	0.390***
	(0.0276)	(0.0274)	(0.0286)	(0.0284)
8th grade ELA assessment (reference=below basic level)				
Basic	0.977	0.986	0.993	1.001
	(0.0571)	(0.0577)	(0.0581)	(0.0586)
Proficient	0.656***	0.660***	0.692***	0.694***
	(0.0445)	(0.0447)	(0.0472)	(0.0474)
Advanced	0.457***	0.459***	0.479***	0.480***
	(0.0390)	(0.0392)	(0.0413)	(0.0413)
Grade (reference=9th grade)				
10th grade	1.867***	1.876***	1.872***	1.876***
	(0.0512)	(0.0514)	(0.0517)	(0.0519)
11th grade	1.121***	1.128***	1.123***	1.128***
	(0.0366)	(0.0368)	(0.0377)	(0.0379)
Gender (reference=Female)				
Male	0.974	0.983	0.975	0.984
	(0.0287)	(0.0289)	(0.0287)	(0.0290)
Ethnicity (reference=White)				
Asian	1.068	1.044	0.889	0.876
	(0.118)	(0.116)	(0.0996)	(0.0980)
Black	1.763***	1.733***	1.199***	1.204***

	(0.0631)	(0.0622)	(0.0578)	(0.0579)
Hispanic	1.015	1.011	0.884	0.888
	(0.0949)	(0.0943)	(0.0834)	(0.0835)
Others	1.294**	1.297**	1.061	1.076
	(0.124)	(0.124)	(0.103)	(0.104)
Lunch (reference=Unreduced lunch)				
Free lunch	2.237***	2.269***	2.029***	2.044***
	(0.0721)	(0.0730)	(0.0697)	(0.0702)
Reduced lunch	1.824***	1.838***	1.773***	1.780***
	(0.100)	(0.101)	(0.0983)	(0.0985)
Homeless (reference=Not homeless)				
Homeless	1.088	1.083	1.046	1.048
	(0.0647)	(0.0644)	(0.0623)	(0.0625)
ELL (reference=Not ELL)				
ELL	0.837***	0.844***	0.739***	0.743***
	(0.0401)	(0.0405)	(0.0387)	(0.0389)
Resident (reference=Resident in the attending school)				
Others	1.326***	1.345***	1.653***	1.666***
	(0.0850)	(0.0861)	(0.115)	(0.116)
Special Education (reference=Not Special Ed.)				
IEP	1.701***	1.688***	1.750***	1.744***
	(0.0662)	(0.0657)	(0.0690)	(0.0687)
Charter school (reference=Not charter school)				
Charter school	0.678**	0.579***	0.531***	0.521***
	(0.0969)	(0.0826)	(0.0764)	(0.0777)
Number of enrolled students			0.986***	0.987***
			(0.00283)	(0.00284)
Percentage of Black students			1.052***	1.050***
			(0.00909)	(0.00927)
Percentage of Hispanic students			1.152*	1.163*
			(0.0808)	(0.0815)
Percentage of other race/ethnicity students			1.697***	1.669***
			(0.0737)	(0.0721)
Percentage of free/reduced lunch			1.021+	1.030**
			(0.0113)	(0.0114)
Percentage of ELL students			0.836***	0.832***
			(0.0431)	(0.0430)
Percentage of special education students			1.004	0.994

			(0.0139)	(0.0137)
Rate of in-school suspension			1.066	
			(0.0758)	
Rate of out-of-school suspension				0.903**
				(0.0317)
Percentage of 8th grade students with math proficient/advanced levels			1.129	1.100
			(0.168)	(0.163)
Percentage of 8th grade students with ELA proficient/advanced levels			0.486***	0.504***
			(0.0768)	(0.0795)
School year (reference=2011)				
2012	0.921	0.905+	0.883*	0.862**
	(0.0514)	(0.0505)	(0.0496)	(0.0484)
2013	0.820***	0.809***	0.770***	0.748***
	(0.0468)	(0.0461)	(0.0445)	(0.0433)
2014	0.820**	0.821**	0.750***	0.735***
	(0.0497)	(0.0497)	(0.0462)	(0.0455)
2015	0.778***	0.783***	0.687***	0.675***
	(0.0484)	(0.0487)	(0.0439)	(0.0433)
2016	0.783***	0.790***	0.687***	0.676***
	(0.0498)	(0.0501)	(0.0455)	(0.0449)
2017	0.722***	0.721***	0.628***	0.607***
	(0.0514)	(0.0513)	(0.0472)	(0.0458)
2018	0.643***	0.645***	0.561***	0.547***
	(0.0556)	(0.0557)	(0.0518)	(0.0505)
Pseudo r-squared	0.0590	0.0590	0.0625	0.0625
lnsig2u	4.528***	4.512***	4.495***	4.474***
	(0.107)	(0.107)	(0.107)	(0.107)
Observations	275040	275040	275040	275040

Exponentiated coefficients; Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Model 1: Student-level variables and in-school suspension are included.
Model 2: Student-level variables and out-of-school suspension are included.
Model 3: Student- and school-level variables and in-school suspension are included.
Model 4: Student- and school-level variables and out-of-school suspension are included.

Table 3

Results of survival analysis for five counties

	Model 1	Model 2	Model 3	Model 4
In-school suspension (reference=No suspension)				
Yes	1.480***		1.480***	
	(0.0261)		(0.0261)	
Out-of-school suspension (reference=No suspension)				
Yes		1.736***		1.713***
		(0.0337)		(0.0335)
Gender (reference=Female)				
Male	0.974+	0.978	0.971+	0.977
	(0.0148)	(0.0149)	(0.0148)	(0.0148)
Ethnicity (reference=White)				
Asian	1.005	0.983	0.910	0.893+
	(0.0648)	(0.0634)	(0.0593)	(0.0582)
Black	1.383***	1.341***	1.203***	1.196***
	(0.0258)	(0.0253)	(0.0318)	(0.0317)
Hispanic	0.987	0.991	0.954	0.963
	(0.0502)	(0.0503)	(0.0491)	(0.0495)
Others	1.269***	1.267***	1.189***	1.198***
	(0.0650)	(0.0649)	(0.0615)	(0.0619)
Lunch in 3rd grade (reference=Unreduced lunch)				
Free lunch	1.877***	1.889***	1.765***	1.768***
	(0.0359)	(0.0361)	(0.0359)	(0.0360)
Reduced lunch	1.507***	1.518***	1.468***	1.478***
	(0.0499)	(0.0503)	(0.0490)	(0.0493)
ELL in 3rd grade (reference=Not ELL)				
ELL	0.925**	0.935**	0.896***	0.906***
	(0.0228)	(0.0231)	(0.0240)	(0.0243)
Resident in 3rd grade (reference=Resident in the attending school)				
Others	1.015	1.029	1.075+	1.071+
	(0.0335)	(0.0340)	(0.0397)	(0.0397)
Homeless in 3rd grade (reference=Not homeless)				
Homeless	1.166***	1.183***	1.098**	1.123***
	(0.0399)	(0.0405)	(0.0378)	(0.0387)

Special Education in 3rd grade (reference=Not Special Ed.)				
IEP	1.340***	1.325***	1.339***	1.325***
	(0.0264)	(0.0261)	(0.0267)	(0.0264)
Charter school	0.564***	0.489***	0.631***	0.559***
	(0.0471)	(0.0408)	(0.0538)	(0.0496)
Achievement level in 8th grade math assessment (reference=Below basic level)				
Basic	0.978	0.983	0.994	0.998
	(0.0194)	(0.0195)	(0.0200)	(0.0201)
Proficient	0.790***	0.793***	0.803***	0.805***
	(0.0204)	(0.0206)	(0.0216)	(0.0217)
Advanced	0.508***	0.507***	0.513***	0.513***
	(0.0206)	(0.0206)	(0.0215)	(0.0215)
Achievement level in 8th grade ELA assessment (reference=Below basic level)				
Basic	0.964	0.969	0.985	0.991
	(0.0259)	(0.0261)	(0.0266)	(0.0268)
Proficient	0.735***	0.741***	0.782***	0.786***
	(0.0242)	(0.0244)	(0.0260)	(0.0261)
Advanced	0.566***	0.570***	0.608***	0.611***
	(0.0260)	(0.0262)	(0.0282)	(0.0283)
Number of enrolled 9th grade students			0.994***	0.994***
			(0.00166)	(0.00167)
Percentage of 9th grade Black students			0.984**	0.982***
			(0.00483)	(0.00497)
Percentage of 9th grade Hispanic students			0.678***	0.689***
			(0.0318)	(0.0321)
Percentage of 9th grade, other race/ethnicity			1.266***	1.262***
			(0.0312)	(0.0312)
Percentage of free/reduced lunch in 9th grade			1.026***	1.031***
			(0.00666)	(0.00668)
Percentage of ELL students			2.175***	2.257***
			(0.210)	(0.218)
Percentage of special education students			1.989***	1.924***
			(0.0659)	(0.0646)
Percentage of in-school suspension in 9th grade			0.715***	
			(0.0386)	

Percentage of 8th grade students with math proficient/advanced levels			1.141^{+}	1.122
			(0.0843)	(0.0831)
Percentage of 8th grade students with ELA proficient/advanced levels			0.528***	0.543***
			(0.0432)	(0.0446)
Percentage of out-of-school suspension in 9th grade				0.943**
				(0.0184)
Observations	366,720	366,720	366,720	366,720
R^2				
Pseudo R^2	0.023	0.023	0.025	0.025

Exponentiated coefficients; Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1

Results of panel regression with in-school suspension, five counties

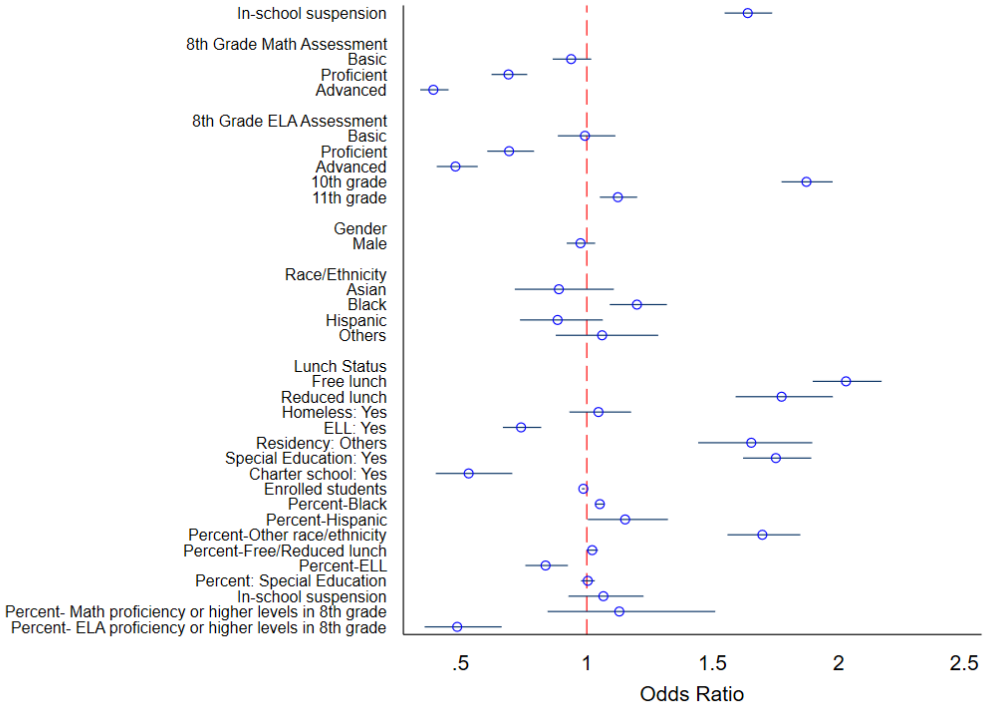


Figure 2

Results of panel regression with out-of-school suspension, five counties

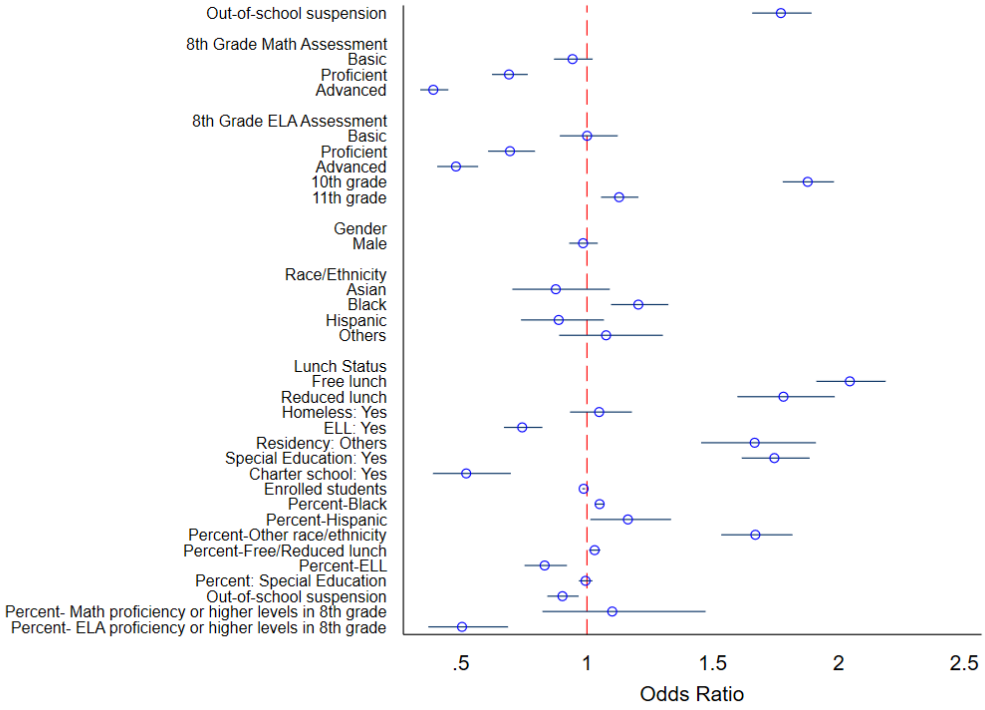


Figure 3

Results of survival analysis by in-school suspension, five counties

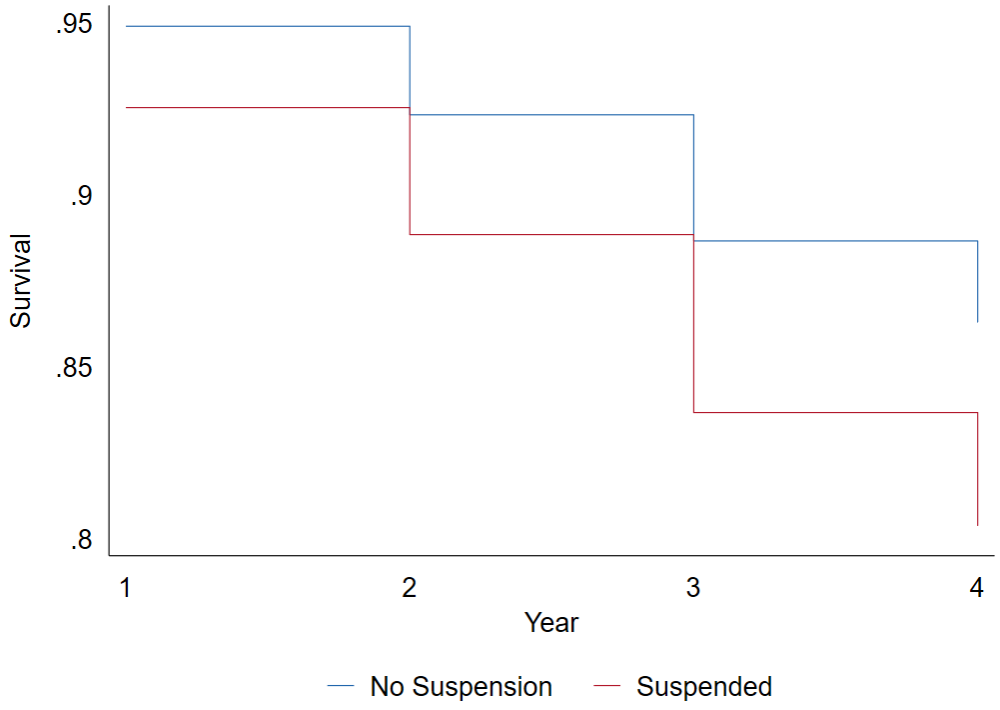
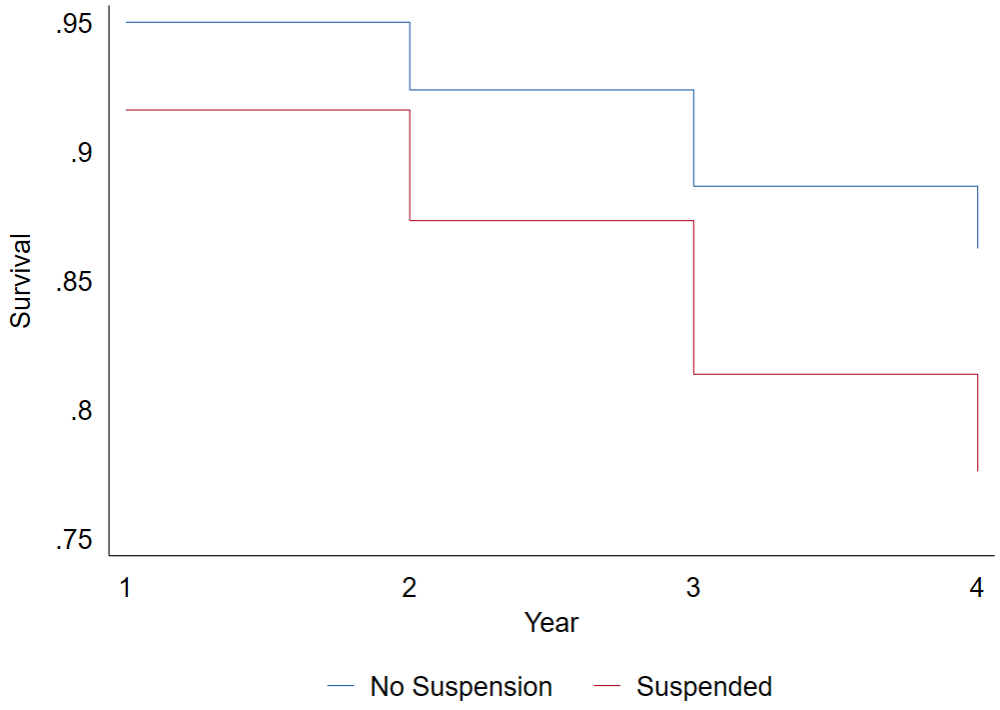


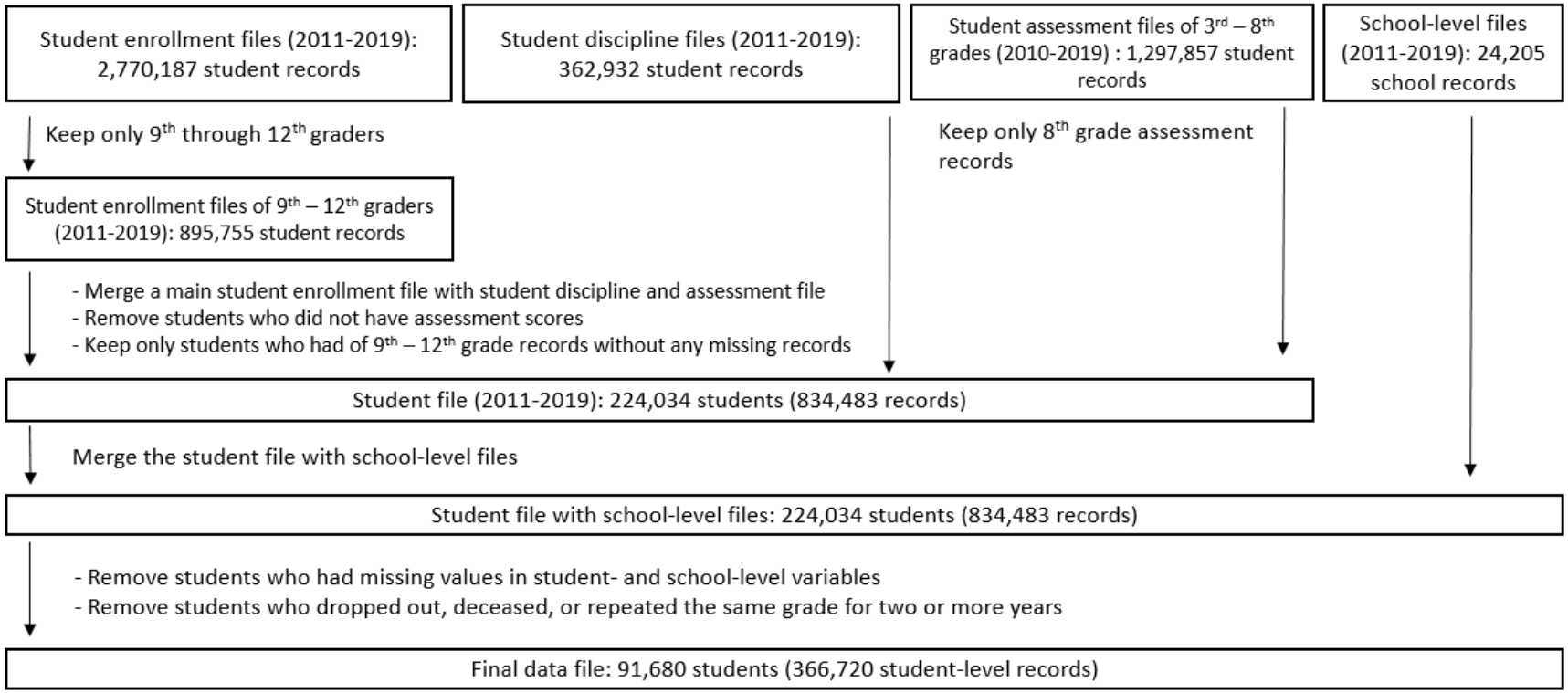
Figure 4

Results of survival analysis by out-of-school suspension, five counties



Appendix A

Data Cleaning Process



Appendix B

Descriptive Statistics for St. Louis City and Surrounding Counties

Table B1

Results of descriptive statistics, St. Louis City only

Student-level variables	Category	9th grade		10th grade		11th grade		12th grade		Total (27,420)	
		N/Mean	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**
Transfer	Non-transfer	6323	92.24%	6365	92.85%	6355	92.71%	6467	94.34%	25510	93.03%
	Transfer	532	7.76%	490	7.15%	500	7.29%	388	5.66%	1910	6.97%
School year	2011	1088	15.87%							1088	3.97%
	2012	1149	16.76%	1088	15.87%					2237	8.16%
	2013	1228	17.91%	1149	16.76%	1088	15.87%			3465	12.64%
	2014	1114	16.25%	1228	17.91%	1149	16.76%	1088	15.87%	4579	16.70%
	2015	1154	16.83%	1114	16.25%	1228	17.91%	1149	16.76%	4645	16.94%
	2016	1122	16.37%	1154	16.83%	1114	16.25%	1228	17.91%	4618	16.84%
	2017			1122	16.37%	1154	16.83%	1114	16.25%	3390	12.36%
	2018					1122	16.37%	1154	16.83%	2276	8.30%
	2019							1122	16.37%	1122	4.09%
In-school suspension	No	5218	76.12%	5272	76.91%	5432	79.24%	5817	84.86%	21739	79.28%
	Yes	1637	23.88%	1583	23.09%	1423	20.76%	1038	15.14%	5681	20.72%
Out-of-school suspension	No	5750	83.88%	5688	82.98%	5850	85.34%	6141	89.58%	23429	85.44%
	Yes	1105	16.12%	1167	17.02%	1005	14.66%	714	10.42%	3991	14.56%
Math proficiency in the 8th grade	Below basic	2513	36.66%	2513	36.66%	2513	36.66%	2513	36.66%	10052	36.66%
	Basic	2587	37.74%	2587	37.74%	2587	37.74%	2587	37.74%	10348	37.74%
	Proficient	1275	18.60%	1275	18.60%	1275	18.60%	1275	18.60%	5100	18.60%
	Advanced	480	7.00%	480	7.00%	480	7.00%	480	7.00%	1920	7.00%
ELA proficiency in the 8th grade	Below basic	910	13.28%	910	13.28%	910	13.28%	910	13.28%	3640	13.28%
	Basic	3917	57.14%	3917	57.14%	3917	57.14%	3917	57.14%	15668	57.14%
	Proficient	1563	22.80%	1563	22.80%	1563	22.80%	1563	22.80%	6252	22.80%
	Advanced	465	6.78%	465	6.78%	465	6.78%	465	6.78%	1860	6.78%
Gender	Female	3807	55.54%	3809	55.57%	3809	55.57%	3808	55.55%	15233	55.55%
	Male	3048	44.46%	3046	44.43%	3046	44.43%	3047	44.45%	12187	44.45%
Race/Ethnicity	White	829	12.09%	826	12.05%	826	12.05%	814	11.87%	3295	12.02%
	Asian	193	2.82%	194	2.83%	193	2.82%	197	2.87%	777	2.83%

	Black	5568	81.23%	5562	81.14%	5562	81.14%	5566	81.20%	22258	81.17%
	Hispanic	221	3.22%	221	3.22%	222	3.24%	224	3.27%	888	3.24%
	Others	44	0.64%	52	0.76%	52	0.76%	54	0.79%	202	0.74%
	Unreduced lunch	730	10.65%	652	9.51%	554	8.08%	390	5.69%	2326	8.48%
Lunch status	Free lunch	5822	84.93%	5984	87.29%	6143	89.61%	6375	93.00%	24324	88.71%
	Reduced lunch	303	4.42%	219	3.19%	158	2.30%	90	1.31%	770	2.81%
Homelessness	Not Homeless	6083	88.74%	5975	87.16%	5880	85.78%	5713	83.34%	23651	86.25%
	Homeless	772	11.26%	880	12.84%	975	14.22%	1142	16.66%	3769	13.75%
ELL status	Not ELL	6252	91.20%	6255	91.25%	6255	91.25%	6256	91.26%	25018	91.24%
	ELL	603	8.80%	600	8.75%	600	8.75%	599	8.74%	2402	8.76%
IEP	Not IEP	5977	87.19%	6025	87.89%	6048	88.23%	6063	88.45%	24113	87.94%
	IEP	878	12.81%	830	12.11%	807	11.77%	792	11.55%	3307	12.06%
Residency	Resident in the attending district	6830	99.64%	6805	99.27%	6797	99.15%	6790	99.05%	27222	99.28%
	Others	25	0.36%	50	0.73%	58	0.85%	65	0.95%	198	0.72%
Charter school	Not charter school	6073	88.59%	6232	90.91%	6281	91.63%	6301	91.92%	24887	90.76%
	Charter school	782	11.41%	623	9.09%	574	8.37%	554	8.08%	2533	9.24%
School-level variables											
Number of enrolled students		656.97	297.06	678.55	347.27	677.56	368.20	660.07	363.82	668.29	345.37
Percentage of Black students		78.46	20.17	77.69	22.02	77.58	22.89	77.58	22.99	77.83	22.05
Percentage of Hispanic students		3.26	2.72	3.42	3.05	3.65	3.44	3.98	3.89	3.58	3.32
Percentage of White students		13.97	15.23	14.54	17.39	14.50	18.23	14.31	18.37	14.33	17.35
Percentage of other race/ethnicity		4.32	4.31	4.35	4.23	4.28	4.30	4.12	4.13	4.27	4.24
Percentage of free/reduced lunch		86.14	15.58	87.93	17.01	90.33	17.34	92.94	17.06	89.33	16.95
Percentage of ELL students		5.19	6.42	5.04	6.65	5.36	7.26	6.09	8.18	5.42	7.17
Percentage of special education students		12.94	7.81	12.70	7.72	12.85	8.14	13.00	8.09	12.87	7.94
Rate of in-school suspension		0.39	1.55	0.40	1.46	0.41	1.44	0.40	1.48	0.40	1.48
Rate of out-of-school suspension		6.61	8.23	5.80	7.60	5.12	6.80	5.22	6.81	5.69	7.40
Percentage of 8th grade students with math proficient/advanced levels		23.21	19.44	23.21	19.44	23.21	19.44	23.21	19.44	23.21	19.44
Percentage of 8th grade students with ELA proficient/advanced levels		27.11	19.11	27.11	19.11	27.11	19.11	27.11	19.11	27.11	19.11

Table B2

Results of descriptive statistics, four counties only

Student-level variables	Category	9th grade		10th grade		11th grade		12th grade		Total (318,628)	
		N/Mean	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**	**N/Mean**	**%/SD**
Transfer	Non-transfer	77454	97.23%	76406	95.92%	74463	93.48%	76062	95.49%	304385	95.53%
	Transfer	2203	2.77%	3251	4.08%	5194	6.52%	3595	4.51%	14243	4.47%
School year	2011	15159	19.03%							15159	4.76%
	2012	14981	18.81%	15159	19.03%					30140	9.46%
	2013	15280	19.18%	14981	18.81%	15159	19.03%			45420	14.25%
	2014	11163	14.01%	15280	19.18%	14981	18.81%	15159	19.03%	56583	17.76%
	2015	11223	14.09%	11163	14.01%	15280	19.18%	14981	18.81%	52647	16.52%
	2016	11851	14.88%	11223	14.09%	11163	14.01%	15280	19.18%	49517	15.54%
	2017			11851	14.88%	11223	14.09%	11163	14.01%	34237	10.75%
	2018					11851	14.88%	11223	14.09%	23074	7.24%
	2019							11851	14.88%	11851	3.72%
In-school suspension	No	70273	88.22%	69835	87.67%	69937	87.80%	71038	89.18%	281083	88.22%
	Yes	9384	11.78%	9822	12.33%	9720	12.20%	8619	10.82%	37545	11.78%
Out-of-school suspension	No	73740	92.57%	73879	92.75%	74339	93.32%	75535	94.83%	297493	93.37%
	Yes	5917	7.43%	5778	7.25%	5318	6.68%	4122	5.17%	21135	6.63%
Math proficiency in the 8th grade	Below basic	11560	14.51%	11560	14.51%	11560	14.51%	11560	14.51%	46240	14.51%
	Basic	25908	32.52%	25908	32.52%	25908	32.52%	25908	32.52%	103632	32.52%
	Proficient	25289	31.75%	25289	31.75%	25289	31.75%	25289	31.75%	101156	31.75%
	Advanced	16900	21.22%	16900	21.22%	16900	21.22%	16900	21.22%	67600	21.22%
ELA proficiency in the 8th grade	Below basic	3645	4.58%	3645	4.58%	3645	4.58%	3645	4.58%	14580	4.58%
	Basic	30737	38.59%	30737	38.59%	30737	38.59%	30737	38.59%	122948	38.59%
	Proficient	29741	37.34%	29741	37.34%	29741	37.34%	29741	37.34%	118964	37.34%
	Advanced	15534	19.50%	15534	19.50%	15534	19.50%	15534	19.50%	62136	19.50%
Gender	Female	39717	49.86%	39708	49.85%	39708	49.85%	39707	49.85%	158840	49.85%
	Male	39940	50.14%	39949	50.15%	39949	50.15%	39950	50.15%	159788	50.15%
Race/Ethnicity	White	55068	69.13%	54954	68.99%	54874	68.89%	54833	68.84%	219729	68.96%
	Asian	1993	2.50%	1984	2.49%	1982	2.49%	1980	2.49%	7939	2.49%
	Black	19168	24.06%	19130	24.02%	19117	24.00%	19085	23.96%	76500	24.01%
	Hispanic	1951	2.45%	2002	2.51%	2043	2.56%	2056	2.58%	8052	2.53%

	Others	1477	1.85%	1587	1.99%	1641	2.06%	1703	2.14%	6408	2.01%
	Unreduced lunch	51064	64.10%	51679	64.88%	52475	65.88%	53170	66.75%	208388	65.40%
Lunch status	Free lunch	24050	30.19%	23926	30.04%	23463	29.46%	23260	29.20%	94699	29.72%
	Reduced lunch	4543	5.70%	4052	5.09%	3719	4.67%	3227	4.05%	15541	4.88%
Homelessness	Not Homeless	78534	98.59%	78405	98.43%	78118	98.07%	77366	97.12%	312423	98.05%
	Homeless	1123	1.41%	1252	1.57%	1539	1.93%	2291	2.88%	6205	1.95%
ELL status	Not ELL	69021	86.65%	72778	91.36%	74473	93.49%	74846	93.96%	291118	91.37%
	ELL	10636	13.35%	6879	8.64%	5184	6.51%	4811	6.04%	27510	8.63%
IEP	Not IEP	68499	85.99%	68587	86.10%	68814	86.39%	69237	86.92%	275137	86.35%
	IEP	11158	14.01%	11070	13.90%	10843	13.61%	10420	13.08%	43491	13.65%
Residency	Resident in the attending district	76640	96.21%	76710	96.30%	76754	96.36%	76769	96.37%	306873	96.31%
	Others	3017	3.79%	2947	3.70%	2903	3.64%	2888	3.63%	11755	3.69%
Charter school	Not charter school	79657	100.00%	79618	99.95%	79616	99.95%	79611	99.94%	318502	99.96%
	Charter school	0	0.00%	39	0.05%	41	0.05%	46	0.06%	126	0.04%
School-level variables											
Number of enrolled students		1501.47	513.74	1482.39	514.07	1464.91	512.26	1452.84	508.32	1475.40	512.43
Percentage of Black students		23.10	29.84	22.97	29.67	23.05	29.80	23.17	30.02	23.07	29.83
Percentage of Hispanic students		2.40	2.02	2.61	2.19	2.85	2.37	3.11	2.56	2.74	2.31
Percentage of White students		70.02	29.44	69.62	29.31	69.03	29.34	68.29	29.49	69.24	29.40
Percentage of other race/ethnicity		4.48	3.75	4.79	3.85	5.07	3.94	5.42	4.11	4.94	3.93
Percentage of free/reduced lunch		32.62	22.18	33.42	23.29	34.06	24.53	34.46	25.85	33.64	24.01
Percentage of ELL students		0.84	1.24	0.90	1.41	0.99	1.59	1.08	1.77	0.95	1.52
Percentage of special education students		13.87	5.45	13.57	6.04	13.41	6.25	13.39	5.65	13.56	5.86
Rate of in-school suspension		0.41	1.52	0.39	1.54	0.38	1.67	0.32	1.20	0.38	1.49
Rate of out-of-school suspension		3.45	3.30	3.04	3.02	2.85	2.76	2.79	2.89	3.03	3.01
Percentage of 8th grade students with math proficient/advanced levels		49.89	18.14	49.89	18.14	49.89	18.14	49.89	18.14	49.89	18.14
Percentage of 8th grade students with ELA proficient/advanced levels		53.99	16.20	53.99	16.20	53.99	16.20	53.99	16.20	53.99	16.20

Appendix C

Subsample Analyses for Panel Regression Models

Table C1

Results of panel regression for St. Louis City only

	Model 1	Model 2	Model 3	Model 4
In-school suspension (Reference=No suspension)				
In-school suspension	1.760***		1.793***	
	(0.124)		(0.125)	
Out-of-school suspension (Reference=No suspension)				
Out-of-school suspension		2.613***		2.480***
		(0.190)		(0.178)
8th grade math assessment (reference=below basic level)				
Basic	0.758**	0.779**	0.826*	0.844*
	(0.0654)	(0.0652)	(0.0697)	(0.0694)
Proficient	0.600***	0.625***	0.697**	0.721**
	(0.0761)	(0.0773)	(0.0886)	(0.0898)
Advanced	0.562**	0.589**	0.717	0.743
	(0.116)	(0.119)	(0.152)	(0.154)
8th grade ELA assessment (reference=below basic level)				
Basic	0.814+	0.842	0.877	0.900
	(0.0897)	(0.0900)	(0.0934)	(0.0933)
Proficient	0.607***	0.635**	0.728*	0.742*
	(0.0894)	(0.0910)	(0.105)	(0.104)
Advanced	0.569*	0.590*	0.799	0.791
	(0.131)	(0.132)	(0.183)	(0.177)
Grade (reference=9th grade)				
10th grade	1.065	1.025	1.040	1.006
	(0.0826)	(0.0790)	(0.0806)	(0.0775)
11th grade	0.895	0.859+	0.845+	0.826*
	(0.0801)	(0.0762)	(0.0770)	(0.0746)
Gender (reference=Female)				
Male	1.019	1.025	1.006	1.011
	(0.0724)	(0.0707)	(0.0692)	(0.0678)
Ethnicity (reference=White)				
Asian	0.952	0.921	1.003	0.968

	(0.270)	(0.254)	(0.278)	(0.261)
Black	1.064	0.993	1.007	0.976
	(0.142)	(0.129)	(0.139)	(0.131)
Hispanic	0.711	0.712	0.717	0.725
	(0.205)	(0.201)	(0.203)	(0.201)
Others	0.712	0.729	0.664	0.690
	(0.376)	(0.377)	(0.346)	(0.352)
Lunch (reference=Unreduced lunch)				
Free lunch	1.185	1.164	1.209	1.190
	(0.156)	(0.151)	(0.164)	(0.160)
Reduced lunch	0.954	0.962	1.025	1.027
	(0.222)	(0.220)	(0.236)	(0.233)
Homeless (reference=Not homeless)				
Homeless	1.490***	1.500***	1.354***	1.373***
	(0.137)	(0.135)	(0.122)	(0.121)
ELL (reference=Not ELL)				
ELL	0.656*	0.703*	0.696*	0.724+
	(0.117)	(0.123)	(0.124)	(0.126)
Resident (reference=Resident in the attending school)				
Others	4.951***	4.980***	4.694***	4.470***
	(1.505)	(1.462)	(1.477)	(1.366)
Special Education (reference=Not Special Ed.)				
IEP	1.032	0.997	0.966	0.946
	(0.111)	(0.104)	(0.101)	(0.0965)
Charter school (reference=Not charter school)				
Charter school	0.816	0.613***	1.002	0.701*
	(0.105)	(0.0781)	(0.136)	(0.111)
Number of enrolled students			0.988	0.988
			(0.0107)	(0.0105)
Percentage of Black students			0.937+	0.926*
			(0.0367)	(0.0358)
Percentage of Hispanic students			0.694	0.714
			(0.159)	(0.162)
Percentage of other race/ethnicity students			0.551***	0.578***
			(0.0878)	(0.0906)
Percentage of free/reduced lunch			0.940	0.942
			(0.0372)	(0.0365)
Percentage of ELL students			1.338**	1.355***

			(0.122)	(0.123)
Percentage of special education students			1.328***	1.261***
			(0.0515)	(0.0497)
Rate of in-school suspension			0.784	
			(0.176)	
Rate of out-of-school suspension				1.026
				(0.0603)
Percentage of 8th grade students with math proficient/advanced levels			1.158	0.956
			(0.474)	(0.383)
Percentage of 8th grade students with ELA proficient/advanced levels			0.457+	0.552
			(0.188)	(0.221)
School year (reference=2011)				
2012	0.977	0.998	1.036	1.079
	(0.153)	(0.155)	(0.161)	(0.166)
2013	0.659**	0.679*	0.752+	0.780
	(0.104)	(0.106)	(0.119)	(0.122)
2014	0.898	0.921	1.051	1.080
	(0.142)	(0.144)	(0.167)	(0.169)
2015	0.778	0.795	0.997	0.988
	(0.126)	(0.127)	(0.172)	(0.169)
2016	0.729+	0.781	0.938	0.961
	(0.119)	(0.126)	(0.163)	(0.165)
2017	0.716+	0.766	0.924	0.948
	(0.132)	(0.139)	(0.180)	(0.182)
2018	0.422***	0.471**	0.546*	0.579*
	(0.0997)	(0.110)	(0.136)	(0.142)
Pseudo r-squared	0.0305	0.0403	.03967	0.0480
lnsig2u	1.410**	1.145	1.106	0.888
	(0.158)	(0.145)	(0.144)	(0.135)
Observations	20565	20565	20565	20565

Exponentiated coefficients; Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C2

Results of panel regression for four counties

	Model 1	Model 2	Model 3	Model 4
In-school suspension (reference=No suspension)				
In-school suspension	1.559***		1.554***	
	(0.0546)		(0.0543)	
Out-of-school suspension (reference=No suspension)				
Out-of-school suspension		1.636***		1.594***
		(0.0670)		(0.0649)
8th grade MA assessment (reference=below basic level)				
Basic	0.927	0.930	0.951	0.958
	(0.0472)	(0.0474)	(0.0481)	(0.0482)
Proficient	0.671***	0.669***	0.681***	0.685***
	(0.0411)	(0.0411)	(0.0422)	(0.0422)
Advanced	0.371***	0.367***	0.364***	0.365***
	(0.0310)	(0.0307)	(0.0309)	(0.0307)
8th grade ELA assessment (reference=below basic level)				
Basic	1.052	1.057	1.057	1.069
	(0.0780)	(0.0786)	(0.0773)	(0.0778)
Proficient	0.647***	0.649***	0.683***	0.690***
	(0.0546)	(0.0548)	(0.0569)	(0.0573)
Advanced	0.447***	0.448***	0.472***	0.476***
	(0.0462)	(0.0463)	(0.0483)	(0.0485)
Grade (reference=9th grade)				
10th grade	2.211***	2.236***	2.183***	2.177***
	(0.0710)	(0.0719)	(0.0706)	(0.0703)
11th grade	1.291***	1.309***	1.263***	1.262***
	(0.0492)	(0.0499)	(0.0497)	(0.0495)
Gender (reference=Female)				
Male	0.978	0.987	0.976	0.983
	(0.0345)	(0.0348)	(0.0340)	(0.0339)
Ethnicity (reference=White)				
Asian	1.248+	1.223	0.968	0.954
	(0.160)	(0.157)	(0.124)	(0.121)
Black	2.461***	2.441***	1.282***	1.280***

	(0.107)	(0.106)	(0.0728)	(0.0722)
Hispanic	1.240*	1.235*	1.020	1.025
	(0.133)	(0.133)	(0.109)	(0.109)
Others	1.382**	1.387**	1.012	1.027
	(0.154)	(0.155)	(0.113)	(0.114)
Lunch (reference=Unreduced lunch)				
Free lunch	2.243***	2.274***	2.031***	2.049***
	(0.0833)	(0.0844)	(0.0787)	(0.0790)
Reduced lunch	1.760***	1.773***	1.704***	1.719***
	(0.109)	(0.110)	(0.106)	(0.106)
Homeless (reference=Not homeless)				
Homeless	1.047	1.040	1.043	1.063
	(0.0841)	(0.0837)	(0.0835)	(0.0848)
ELL (reference=Not ELL)				
ELL	0.820***	0.825***	0.663***	0.654***
	(0.0457)	(0.0460)	(0.0418)	(0.0411)
Resident (reference=Resident in the attending school)				
Others	1.156*	1.171*	1.697***	1.709***
	(0.0834)	(0.0845)	(0.133)	(0.133)
Special Education (reference=Not Special Ed.)				
IEP	1.878***	1.871***	1.926***	1.927***
	(0.0864)	(0.0861)	(0.0884)	(0.0878)
Charter school (reference=Not charter school)				
Charter school	0.641	0.568	0.407	0.547
	(0.364)	(0.322)	(0.230)	(0.314)
Number of enrolled students			0.982***	0.983***
			(0.00340)	(0.00339)
Percentage of Black students			1.131***	1.146***
			(0.0118)	(0.0123)
Percentage of Hispanic students			0.966	1.041
			(0.0859)	(0.0927)
Percentage of other race/ethnicity students			1.737***	1.719***
			(0.0905)	(0.0889)
Percentage of free/reduced lunch			0.992	1.010
			(0.0130)	(0.0132)
Percentage of ELL students			2.663***	2.582***
			(0.290)	(0.280)
Percentage of special education students			0.979	0.973+

			(0.0156)	(0.0153)
Rate of in-school suspension			1.091	
			(0.0880)	
Rate of out-of-school suspension				0.676***
				(0.0354)
Percentage of 8th grade students with math proficient/advanced levels			1.575*	1.503*
			(0.302)	(0.286)
Percentage of 8th grade students with ELA proficient/advanced levels			0.362***	0.376***
			(0.0766)	(0.0789)
School year (reference=2011)				
2012	0.926	0.905	0.889+	0.847*
	(0.0602)	(0.0590)	(0.0581)	(0.0552)
2013	0.834**	0.820**	0.773***	0.718***
	(0.0558)	(0.0549)	(0.0523)	(0.0486)
2014	0.804**	0.804**	0.737***	0.674***
	(0.0576)	(0.0577)	(0.0534)	(0.0492)
2015	0.780***	0.785**	0.692***	0.629***
	(0.0575)	(0.0580)	(0.0521)	(0.0478)
2016	0.782**	0.784**	0.695***	0.622***
	(0.0592)	(0.0594)	(0.0546)	(0.0495)
2017	0.738***	0.734***	0.634***	0.557***
	(0.0622)	(0.0620)	(0.0564)	(0.0501)
2018	0.699***	0.697***	0.604***	0.541***
	(0.0709)	(0.0706)	(0.0658)	(0.0591)
Pseudo r-squared	0.0671	0.0669	0.0748	0.0749
lnsig2u	5.565***	5.584***	5.268***	5.167***
	(0.147)	(0.148)	(0.140)	(0.139)
Observations	238971	238971	238971	238971

Exponentiated coefficients; Standard errors in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure C1

Results of panel regression with in-school suspension, St. Louis City only

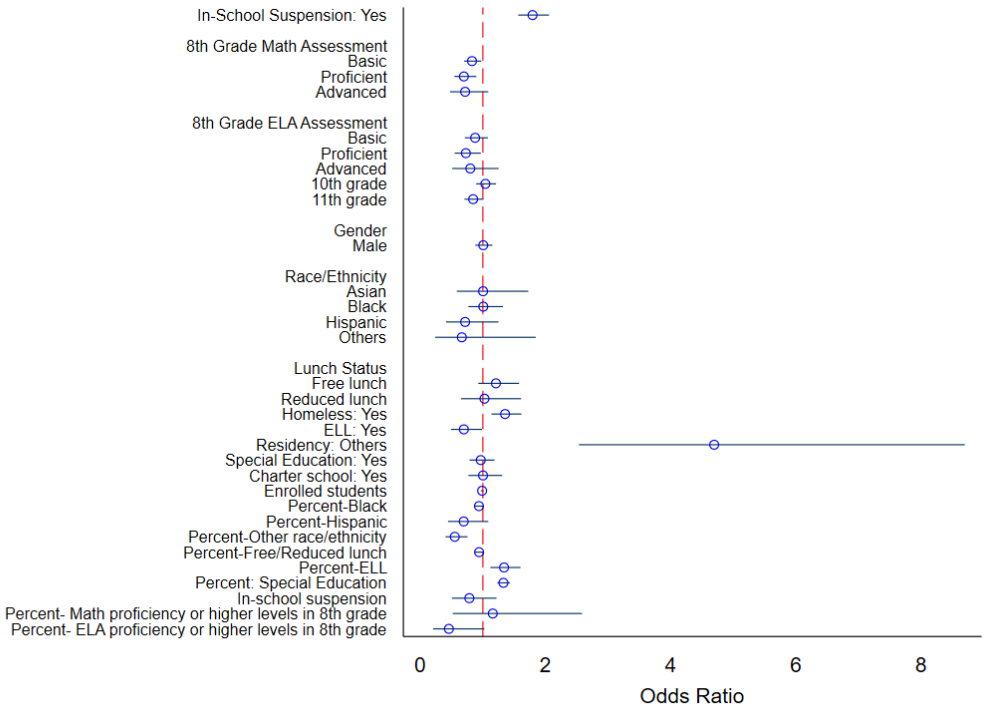


Figure C2

Results of panel regression with out-of-school suspension, St. Louis City only

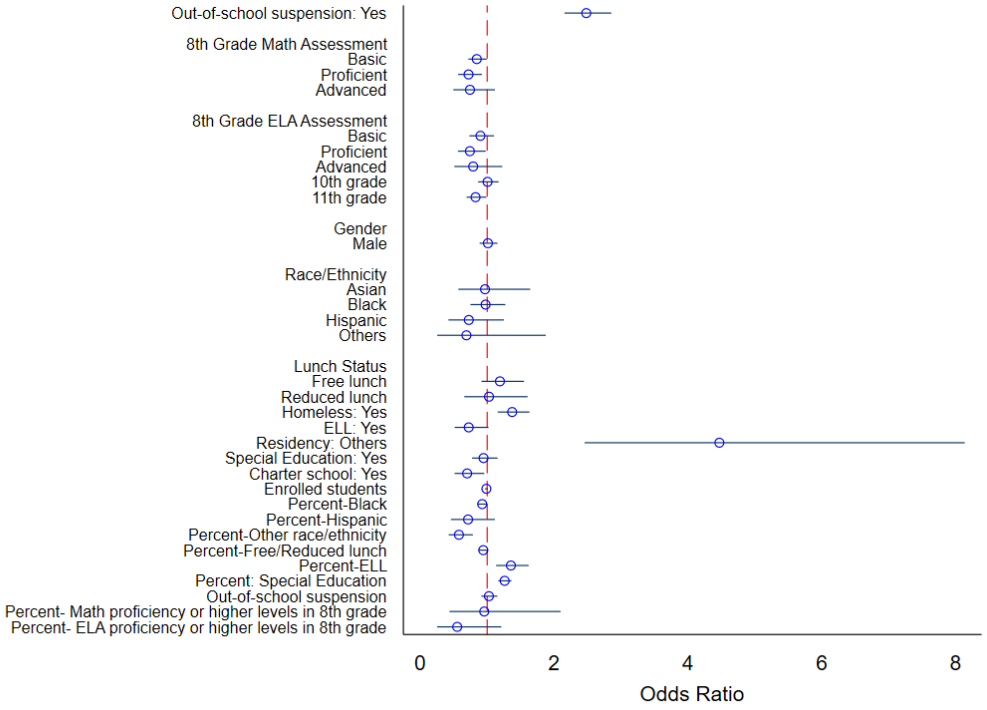


Figure C3

Results of panel regression with in-school suspension, four counties

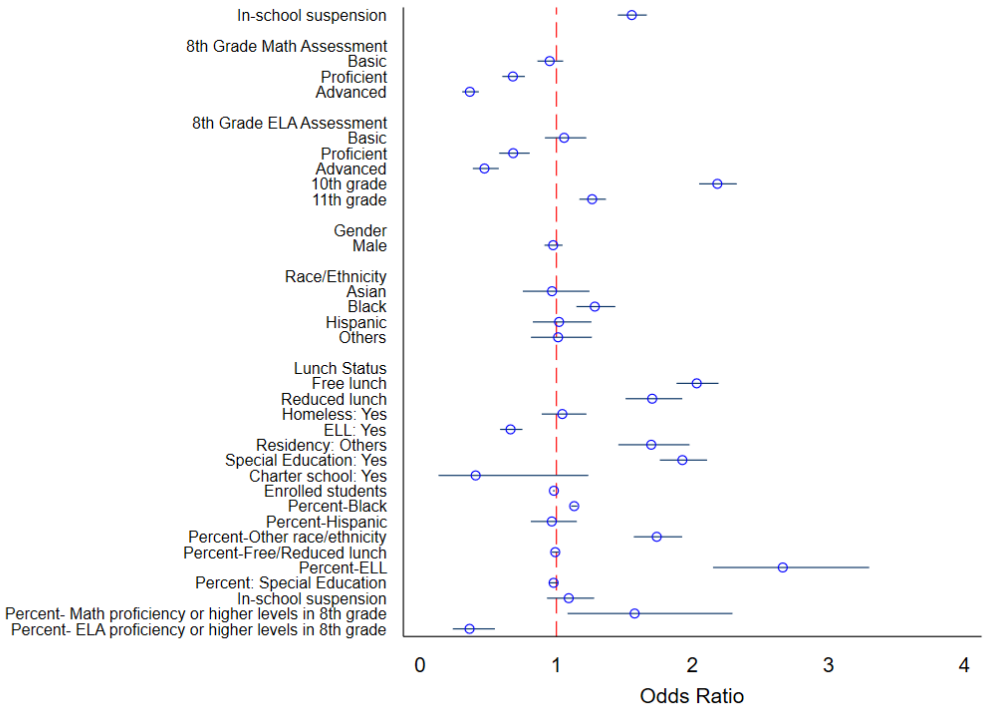
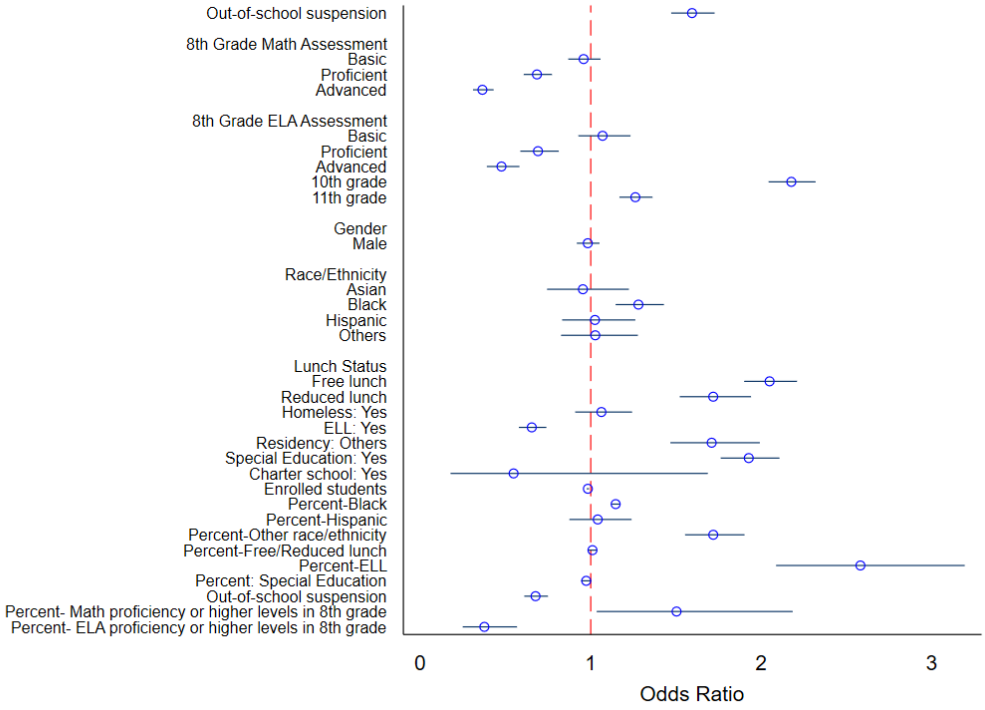


Figure C4

Results of panel regression with out-of-school suspension, four counties



Appendix D

Subsample Analyses for Survival Models

Table D1

Results of survival analysis, St. Louis City only

	Model 1	Model 2	Model 3	Model 4
In-school suspension (reference=No suspension)				
Yes	1.780***		1.826***	
	(0.0859)		(0.0904)	
Out-of-school suspension (reference=No suspension)				
Yes		2.589***		2.375***
		(0.130)		(0.121)
Gender (reference=Female)				
Male	1.053	1.061	1.023	1.031
	(0.0495)	(0.0500)	(0.0484)	(0.0489)
Ethnicity (reference=White)				
Asian	1.264	1.211	1.278	1.215
	(0.255)	(0.246)	(0.259)	(0.248)
Black	1.134	1.052	0.969	0.942
	(0.108)	(0.101)	(0.0978)	(0.0954)
Hispanic	1.020	1.001	0.961	0.960
	(0.206)	(0.203)	(0.195)	(0.195)
Others	0.969	0.955	1.027	1.024
	(0.334)	(0.330)	(0.355)	(0.354)
Lunch in 9th grade (reference=Unreduced lunch)				
Free lunch	1.127	1.100	1.102	1.075
	(0.102)	(0.0993)	(0.105)	(0.102)
Reduced lunch	0.784	0.774	0.808	0.795
	(0.127)	(0.126)	(0.132)	(0.129)
ELL in 9th grade (reference=Not ELL)				
ELL	0.575***	0.604***	0.598***	0.602***
	(0.0785)	(0.0842)	(0.0831)	(0.0851)
Resident in 9th grade (reference=Resident in the attending school)				
Others	2.400**	1.880+	2.365**	1.920*
	(0.784)	(0.608)	(0.781)	(0.626)

Homeless in 9th grade (reference=Not homeless)				
Homeless	1.273***	1.317***	1.170*	1.200**
	(0.0806)	(0.0834)	(0.0750)	(0.0772)
Special Education in 9th grade (reference=Not Special Ed.)				
IEP	1.047	0.997	1.011	0.980
	(0.0714)	(0.0681)	(0.0693)	(0.0673)
Charter school	0.710***	0.535***	0.682***	0.436***
	(0.0621)	(0.0468)	(0.0652)	(0.0518)
Achievement level in 8th grade math assessment (reference=Below basic level)				
Basic	0.844**	0.863**	0.882*	0.910
	(0.0473)	(0.0485)	(0.0505)	(0.0523)
Proficient	0.656***	0.686***	0.700***	0.740**
	(0.0570)	(0.0601)	(0.0636)	(0.0677)
Advanced	0.601***	0.605***	0.644**	0.649**
	(0.0878)	(0.0881)	(0.101)	(0.101)
Achievement level in 8th grade ELA assessment (reference=Below basic level)				
Basic	0.828**	0.842*	0.879+	0.901
	(0.0566)	(0.0577)	(0.0609)	(0.0628)
Proficient	0.696***	0.710***	0.802*	0.809*
	(0.0667)	(0.0685)	(0.0781)	(0.0794)
Advanced	0.714*	0.737+	0.880	0.880
	(0.112)	(0.116)	(0.141)	(0.142)
Number of enrolled 9th grade students			0.969**	0.968**
			(0.0102)	(0.0102)
Percentage of 9th grade Black students			1.136**	1.061
			(0.0457)	(0.0442)
Percentage of 9th grade Hispanic students			1.692**	1.589**
			(0.310)	(0.285)
Percentage of 9th grade, other race/ethnicity			1.073	0.904
			(0.160)	(0.142)
Percentage of free/reduced lunch in 9th grade			0.928**	0.932**
			(0.0252)	(0.0247)
Percentage of ELL students in 9th grade			0.926	1.057
			(0.0738)	(0.0856)
Percentage of special education students in 9th grade			1.560***	1.334***
			(0.0725)	(0.0696)

Percentage of in-school suspension in 9th grade			1.387*	
			(0.199)	
Percentage of math proficient/advanced levels in the 8th grade			1.542	1.316
			(0.422)	(0.363)
Percentage of ELA proficient/advanced levels in the 8th grade			0.565*	0.634
			(0.156)	(0.176)
Percentage of out-of-school suspension in 9th grade				1.177***
				(0.0506)
Observations	27,420	27,420	27,420	27,420
R^2				
Pseudo R^2	0.013	0.019	0.017	0.022

Exponentiated coefficients; Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table D2

Results of survival analysis, four counties only

	Model 1	Model 2	Model 3	Model 4
In-school suspension (reference=No suspension)				
Yes	1.362***		1.350***	
	(0.0282)		(0.0282)	
Out-of-school suspension (reference=No suspension)				
Yes		1.564***		1.529***
		(0.0357)		(0.0352)
Gender (reference=Female)				
Male	0.971+	0.974	0.975	0.978
	(0.0167)	(0.0167)	(0.0168)	(0.0168)
Ethnicity (reference=White)				
Asian	1.123	1.102	0.974	0.932
	(0.0797)	(0.0782)	(0.0697)	(0.0668)
Black	1.688***	1.641***	1.227***	1.207***
	(0.0354)	(0.0348)	(0.0365)	(0.0357)
Hispanic	1.111+	1.115*	1.009	1.016
	(0.0612)	(0.0614)	(0.0562)	(0.0565)
Others	1.319***	1.317***	1.111+	1.127*
	(0.0751)	(0.0750)	(0.0641)	(0.0649)
Lunch in 3rd grade (reference=Unreduced lunch)				
Free lunch	1.819***	1.820***	1.702***	1.698***
	(0.0380)	(0.0380)	(0.0375)	(0.0374)
Reduced lunch	1.492***	1.502***	1.468***	1.478***
	(0.0533)	(0.0536)	(0.0527)	(0.0531)
ELL in 3rd grade (reference=Not ELL)				
ELL	0.935*	0.942*	0.875***	0.900***
	(0.0249)	(0.0251)	(0.0269)	(0.0275)
Resident in 3rd grade (reference=Resident in the attending school)				
Others	0.920*	0.938+	1.062	1.078+
	(0.0318)	(0.0324)	(0.0416)	(0.0425)
Homeless in 3rd grade (reference=Not homeless)				

Homeless	1.171***	1.174***	1.152**	1.182***
	(0.0550)	(0.0551)	(0.0542)	(0.0556)
Special Education in 3rd grade (reference=Not Special Ed.)				
IEP	1.397***	1.390***	1.398***	1.399***
	(0.0307)	(0.0306)	(0.0311)	(0.0311)
Achievement level in 8th grade math assessment (reference=Below basic level)				
Basic	0.985	0.990	0.990	1.001
	(0.0225)	(0.0227)	(0.0230)	(0.0233)
Proficient	0.798***	0.801***	0.795***	0.800***
	(0.0233)	(0.0234)	(0.0241)	(0.0242)
Advanced	0.501***	0.501***	0.490***	0.489***
	(0.0226)	(0.0226)	(0.0227)	(0.0227)
Achievement level in 8th grade ELA assessment (reference=Below basic level)				
Basic	1.009	1.015	1.016	1.040
	(0.0322)	(0.0324)	(0.0326)	(0.0334)
Proficient	0.733***	0.740***	0.765***	0.784***
	(0.0280)	(0.0283)	(0.0295)	(0.0302)
Advanced	0.568***	0.573***	0.597***	0.613***
	(0.0294)	(0.0297)	(0.0311)	(0.0320)
Number of enrolled 9th grade students			0.999	0.997
			(0.00196)	(0.00195)
Percentage of 9th grade Black students			1.005	1.030***
			(0.00571)	(0.00627)
Percentage of 9th grade Hispanic students			0.880**	0.692***
			(0.0421)	(0.0376)
Percentage of 9th grade, other race/ethnicity			1.547***	1.388***
			(0.0419)	(0.0386)
Percentage of free/reduced lunch in 9th grade			1.035***	1.035***
			(0.00755)	(0.00763)
Percentage of special education students in 9th grade			2.297***	1.896***
			(0.111)	(0.0948)
Percentage of in-school suspension in 9th grade			0.630***	
			(0.0395)	
Percentage of 8th grade students with math proficient/advanced levels			1.397***	1.362***
			(0.124)	(0.120)

Percentage of 8th grade students with ELA proficient/advanced levels			0.361***	0.409***
			(0.0369)	(0.0418)
Percentage of ELL students in 9th grade				5.837***
				(0.752)
Percentage of out-of-school suspension in 9th grade				0.762***
				(0.0218)
Observations	318,628	318,628	318,628	318,628
R^2				
Pseudo R^2	0.026	0.027	0.029	0.030

Exponentiated coefficients; Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure D1

Results of survival analysis by in-school suspension, St. Louis City only

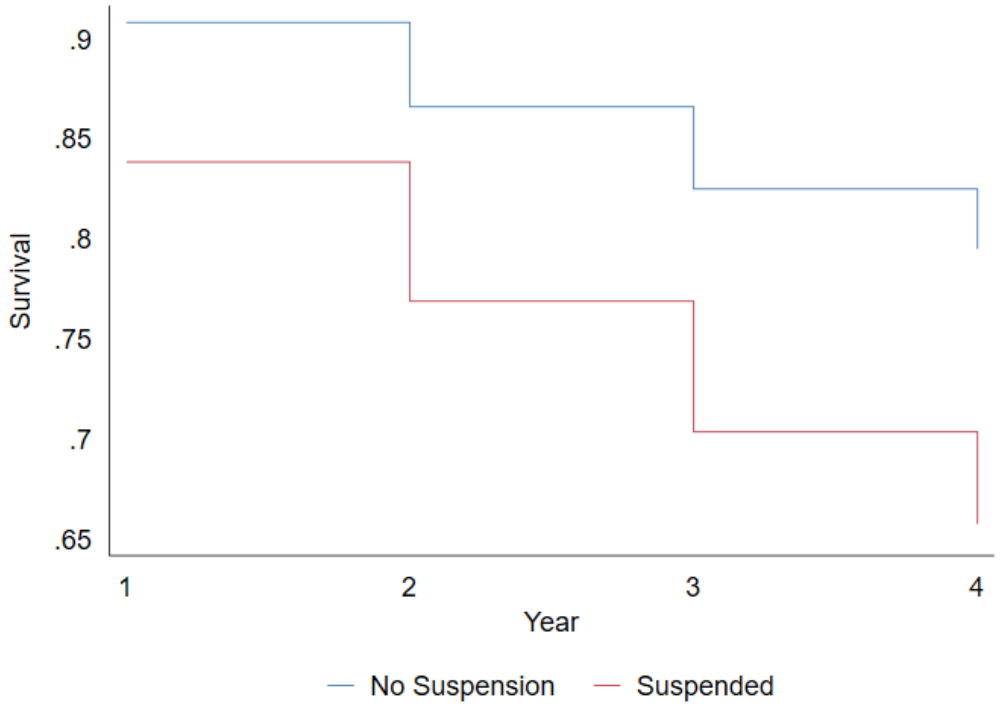


Figure D2

Results of survival analysis by out-of-school suspension, St. Louis City only

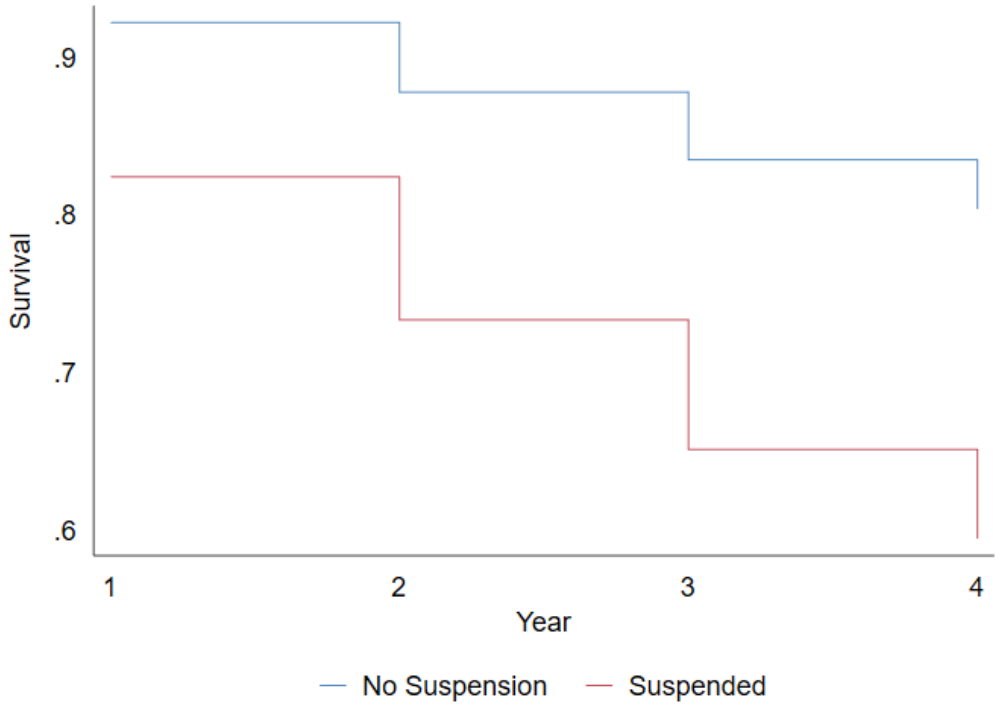


Figure D3

Results of survival analysis by in-school suspension, 4 counties only

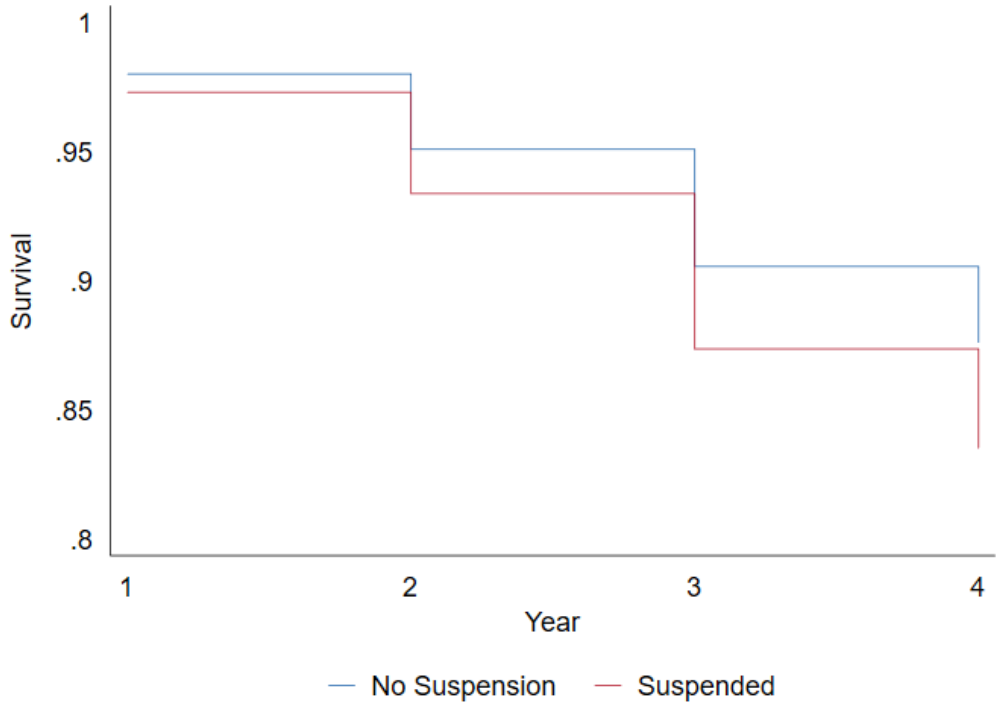


Figure D4

Results of survival analysis by out-of-school suspension, 4 counties only