

# More Than Shortages: The Unequal Distribution of Substitute Teaching

Jing Liu\*

Susanna Loeb†

Ying Shi‡

## Abstract:

Classroom teachers in the US are absent on average approximately six percent of a school year. Despite the prevalence of teacher absences, surprisingly little research has assessed the key source of replacement instruction: substitute teachers. Using detailed administrative and survey data from a large urban school district, we document the prevalence, predictors, and variation of substitute coverage across schools. Less advantaged schools systematically exhibit lower rates of substitute coverage compared with peer institutions. Observed school, teacher, and absence characteristics account for only part of this school variation. In contrast, substitute teachers' preferences for specific schools, mainly driven by student behavior and support from teachers and school administrators, explain a sizable share of the unequal distribution of coverage rates above and beyond standard measures in administrative data.

Keywords: substitute teachers; inequality; K-12 education.

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\* Postdoctoral Research Associate, Annenberg Institute, Brown University. Email: [jingliu@brown.edu](mailto:jingliu@brown.edu).

† Professor of Education and International and Public Affairs, Director, Annenberg Institute, Brown University. Email: [susanna\\_loeb@brown.edu](mailto:susanna_loeb@brown.edu).

‡ Assistant Professor, Maxwell School of Citizenship and Public Affairs, Syracuse University. Email: [yshi78@maxwell.syr.edu](mailto:yshi78@maxwell.syr.edu).

## Introduction

Teachers are absent from school for a variety of reasons including illness, family emergencies, and in-service training requirements. According to the U.S. Department of Education, over 6.5 million students in 2013-2014 attended a school where at least half of teachers missed ten or more days of school.<sup>1</sup> A related estimate using data from large US metropolitan districts finds that, on average, teachers missed almost 11 days out of a 186-day school year, between five and six percent of the school year (Joseph, Waymack, and Zielaski 2014). This frequency translates to approximately two-thirds of a school year for a child remaining in public schools throughout their K-12 education. In some contexts, schools serving a higher proportion of non-white and low-income students experience even more teacher absences (Clotfelter, Ladd, and Vigdor 2009).

Studies have consistently documented negative effects of teacher absences on student achievement (Miller, Murnane, and Willett 2008; Clotfelter, Ladd, and Vigdor 2009; Herrmann and Rockoff 2012). For example, Herrmann and Rockoff (2012) show that ten additional teacher absences lead to 1.2% and 0.6% of a standard deviation decrease in math and English Language Arts (ELA) test scores, respectively.<sup>2</sup> A question prompted by these findings is how the main source of replacement instruction for teacher absences, substitute teachers, can mediate such effects. The only study that incorporates information about substitute teachers into its assessment

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<sup>1</sup> Absenteeism in K-12 education and other public sectors are generally higher than absenteeism in the private sector. In the U.S., the absence rate defined as the ratio of workers with absences to total full-time wage and salary employment is 3.4 percent for public sector workers, compared to 2.7 percent for private sector workers (Bureau of Labor Statistics 2020).

<sup>2</sup> The detrimental effects of teacher absences may materialize through several channels other than substitute teachers. Absences create disruptions in classroom instruction that can negatively impact student learning. They can also decrease the time students spend in classrooms by increasing student absences, as some students may deliberately miss class to avoid facing a substitute teacher. To our knowledge, little empirical research illuminates these mechanisms.

of teacher absence effects is Clotfelter, Ladd, and Vigdor (2009), which shows that certified substitute teachers can somewhat mitigate the negative impact of teacher absences.

Alongside concerns about how substitute teachers' quality might affect student learning, is a shortage of substitute teachers. One study surveyed a random sample of 500 U.S. school districts and found that the majority of districts expressed difficulty with hiring qualified substitute teachers (Dorward, Hawkins, and Smith 2000).<sup>3</sup> Strauss and Strauss (2003) show that school districts in southwest Pennsylvania covered between 80-85% of teacher absences, and substantially more systemic planning is necessary to meet the varying and outsized demand for substitute teachers. The inability to find a substitute teacher when the regular teacher is absent might not initially seem problematic. Another teacher or an administrator who has spare time can cover a classroom when a teacher is absent and a substitute teacher is not available. Yet repeated occurrences can quickly become burdensome for teachers and administrators who frequently cover a peer's classroom.

Understanding the substitute teacher workforce may help address the negative teacher absence effect and the shortage of substitute teachers. Yet only a few case studies have examined substitute teachers, with a focus on the factors that might drive their preferences and choices. Coverdill and Oulevey (2007) show that substitute teachers prefer getting jobs through personal relationships with regular teachers than through an automated call system. Strauss and Strauss (2003) provide some evidence that discipline in school, safety of school, and daily pay are among the most important factors for substitute teachers' decision making, while the attitudes of professional staff and whether a position can advance their professional career can also influence

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<sup>3</sup> The Madison district in Ohio, for example, reports having less than a third of the substitute teachers needed to cover classes, the lowest number in 18 years (<https://www.aasa.org/SchoolAdministratorArticle.aspx?id=14662>). In Michigan, districts have been using billboards to attract potential substitute teacher candidates, given shortages that are prevalent across the state (<https://www.freep.com/story/news/education/2016/12/25/michigan-substitute-teachers-shortages/95622652/>).

their decisions. Gershenson (2012) analyzes data from a Michigan school district that uses an automated calling system to find substitutes when teachers cannot fill their absences with personal arrangements. This system randomly calls substitutes available until a job is accepted. Using a sequential binary-choice model, the author concludes that a variety of nonmonetary factors affect substitutes, including the job's timing, commute time, class subject, and school level. After controlling for average achievement, a school's demographic composition has little influence on substitutes' job acceptance decisions. None of the papers to date comprehensively assesses the composition of the substitute teacher workforce, how schools vary in teacher absence coverage by substitutes, or what factors drive the observed patterns.

The current paper advances the literature by describing the distribution of absence coverage across schools, exploring the roles of school-, teacher-, and absence-level attributes in affecting coverage rates, and examining the factors driving substitute teachers' preferences for particular schools. In doing so it draws on research on disparities in the distribution of teachers, and extends the literature to include substitute teachers, a previously under-studied source of access to instruction. Numerous studies have established that low-income, low-achieving, and minority students are systematically more likely to be taught by less qualified teachers (Lankford, Loeb, and Wyckoff 2002; Boyd et al. 2005; Kalogrides and Loeb 2013). Low-income students also experience more teacher absences compared with their high-income peers (Clotfelter, Ladd, and Vigdor 2009). We provide the first empirical evidence on the extent to which this holds for *access to* substitute teaching when regular teachers are absent. The paper also sheds light on potential policy avenues to mediate the negative effects of teacher absences and informs the tailoring of programs to specific schools that face the most onerous challenges in recruiting, supporting, and retaining substitute teachers.

Using novel administrative data on teacher absence coverage and survey data for teachers and substitute teachers, we investigate the substitute teaching workforce in a large urban school district in California. In particular, we ask the following research questions:

- **Research Question 1: Prevalence.** *How prevalent are teacher absences, how often are absences not covered by substitute teachers, and what happens when a substitute cannot be found?*
- **Research Question 2: Teacher and absence attributes.** *How do teacher and absence characteristics predict the probability of absence coverage?*
- **Research Question 3: School variation.** *How do teacher absences and substitute teacher coverage vary across schools, and to what extent do teacher and absence characteristics explain the school variation?*
- **Research Question 4: Substitute teacher preferences.** *Which factors drive substitute teachers' preferences for specific schools, and how do their preferences explain the distribution of non-covered absences across schools?*

The remainder of this paper proceeds as follows. After briefly introducing the institutional context of the focal district, we describe both our administrative data and survey datasets. We then provide details on the incidence of teacher absences and substitute teacher coverage. We move on to examine predictors of substitute teacher coverage, how teacher absences and coverage rates vary between schools, and whether observed teacher and absence attributes can explain such disparities. We use survey data to disentangle the factors affecting substitute teachers' preferences, and to determine how such preferences drive the observed distribution of substitute coverage. We conclude with a discussion of policy implications.

## **Data and Sample**

### *Study context*

Our study takes place in the context of a large urban school district with a diverse population of students. During the 2017-2018 school year, a total of 122 schools at the K-12 level served roughly 53,000 students, slightly over half of whom were Asian. Hispanic, black, and white students made up 21%, 10%, and 8%, respectively.

While no two districts are exactly the same, the district's recruiting and onboarding process for substitute teachers follows most other districts in exempting candidates from certification requirements expected of regular teachers. Candidates interested in joining the substitute teacher pool must hold at least a Bachelor's degree and meet minimum skill thresholds on standardized tests of basic skills. Those who are accepted into the pool then obtain an emergency 30-day substitute teaching permit, which authorizes them to serve as a day-to-day substitute teacher in any classroom.<sup>4</sup>

The process of finding substitute teachers varies across schools and even within schools. Based on interviews with several current substitute teachers and district leaders, schools use least three ways to find a substitute teacher when a regular teacher is absent: 1) regular teachers or school administrators reach out to substitute teachers they know to arrange coverage; 2) substitute teachers log into a website that posts substitute teaching jobs and choose a job they prefer; 3) schools use an automated system to call substitute teachers who they have on their list until they find one who accepts the offer.

District programs aim to incentivize substitutes to work more frequently and to work in high-needs schools. In order to remain active in the teaching pool, substitute teachers must work

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<sup>4</sup> The holder of this permit cannot serve as a substitute for more than 30 days for any given regular teacher during the school year. The permit is valid for one year and is renewable.

no fewer than 36 days per school year. Upon reaching 70 days of service in a calendar year, substitutes receive a raise in daily compensation. A small subset of substitute teachers exclusively serves hard-to-staff schools, schools that historically exhibited high staff turnover and are on the receiving end of funding targeted towards improving instructional quality. The district offers these substitutes additional compensation in the form of higher daily pay and health benefits. In return, these approximately 20 designated substitute teachers cannot turn down an offer if they are called to serve at one of the targeted schools.

### *Administrative Data*

We use an unusually rich administrative dataset that links daily teacher absences to substitute teachers and their attributes. A novel feature of this dataset is that it provides a day-by-day account of each time a given teacher is away from the classroom. We use the term “job” to describe each period that each teacher is absent. Each job includes information on the reason for the absence, when it is initiated and accepted by a substitute teacher if covered, and unique identifiers for both the regular and substitute teacher. We observe teachers’ and substitute teachers’ demographic characteristics alongside time-varying attributes such as years of experience. Teacher identifiers permit linking the data to student files containing demographics and test performance.

The data cover all teacher absences for K-12 schools in this district from school year 2011-2012 through 2017-2018. In total, we observe over 5,200 unique teachers who accrued 19,000 absences of various length and a total of 1,873 unique substitute teachers during this period. Table 1 describes regular teachers and substitute teachers in the district. 68 percent of regular teachers are female, and nearly half are white. Five percent of teachers are Black, and 14 percent are Hispanic, which is approximately half the percent of black and Hispanic students in

the district. The demographics of substitute teachers are quite similar to those of regular teachers. Regular teachers have 8.5 years of teaching experience on average. Since substitute teachers only work on occasions when regular teachers are absent, one way to characterize their experience is by number of days they have substituted. On average, a substitute teacher works for 46 days per school year compared to 180 expected instructional days for a regular classroom teacher.

### *Survey Data*

We supplement our administrative data with a survey of substitute teachers who served the district at least once during the 2017-2018 school year. The goal of the survey is to gain an understanding of substitute teachers' preferences and how these preferences shape the distribution of substitute coverage in the district. The survey asked substitute teachers to identify the three schools they would most prefer to work in and the reasons for these preferences. Similarly, the survey asked respondents to identify three schools in which they would least like to working and the corresponding reasons. Of the 769 substitute teachers in the sample, 69% responded to the survey.<sup>5</sup>

We also administered a survey to regular teachers in the district to understand classroom coverage during teacher absences and how teachers perceive the shortages of substitute teachers. We administered this survey in school year 2017-2018 to nearly 2,500 teachers while providing the same financial incentive of 15 dollars as we do for substitute teachers. The response rate is slightly higher than, but quite similar to, that for the substitute teacher survey (73%).

## **Results**

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<sup>5</sup> We provided a financial incentive of a 15-dollar gift card to those who completed the survey.



*Research Question 1: How prevalent are teacher absences, how often are absences not covered by substitute teachers, and what happens when a substitute cannot be found?* Table 2 provides summary statistics on the characteristics of teacher absences and associated substitute teacher coverage. Teachers are absent an average of 11.8 days per year, a count that is similar to previous studies (Miller, Murnane, and Willett 2008; Clotfelter, Ladd, and Vigdor 2009; Herrmann and Rockoff 2012). Translated to a 180-day school year, teachers are absent 6.6% of the time. Figure 1 plots the distribution of total annual teacher absences using the sample of teacher-by-year observations from 2012-2018. Three percent of teachers have perfect attendance, which is similar to earlier findings on the share of teachers who are never absent in a given academic year (Herrmann and Rockoff 2012). The modal number of absences is 9 days. The distribution skews to the right, with a small group of teachers absent for a substantial portion of the 180-day school year.

Teachers are absent for unforeseen reasons including illness as well as for anticipated activities such as district-wide or site-specific training and administrative activities. We distinguish between four reasons for teacher absences: 1) sick leave, 2) personal leave, 3) professional development or permission days (PD), and 4) other administrative leave. Under collectively bargained contracts, teachers are credited with 10 days of paid sick leave per year for illnesses and injury. In addition to sick leave, seven days from this allowance can also be used towards personal leave, defined as personal, legal, business, religious, household, family, or other tasks that require attention during school hours. Personal leave encompasses all personal circumstances involving the teacher, their immediate family, or property that require immediate attention. Teachers are also given paid release time to attend meetings and conferences for

professional development purposes.<sup>6</sup> The last category of other administrative leave includes bereavement, jury duty, administrative leave, military leave, legal purposes, and special assignment. The largest component of absences is sick leave, with teachers averaging nearly 5 days per school year. Personal leaves accrue 2.9 days on average. The average teacher also takes off an average of 3.4 days for professional development and 0.6 days for other administrative purposes.

Substitute teachers cover most but not all teacher absences. An average of 0.9 days per teacher is not covered by a substitute teacher out of the total 11.8 teacher absences per year. This means that for an average teacher, her classroom does not have replacement instruction from a substitute teacher for 7.5% of the time she is absent from the classroom. Even though few other studies provide this information, the finding is consistent with documented shortages of qualified substitute teachers across U.S. districts (Dorward, Hawkins, and Smith 2000). Figure 2 shows the distribution of the share of absences that are not covered by a substitute teacher at the teacher-by-year level. Approximately half of teachers have perfect absence coverage. The density is steadily decreasing, with approximately 24% of teachers having between 0 and 10% of non-covered absences in a given year. The distribution is again right-skewed, with less than 1% of teacher-year observations that have not found a substitute teacher for more than half of absences.

The teacher survey provides insights into what happens to classrooms when teachers are absent. One question asks for the most likely scenario when the school cannot find a substitute teacher, with the following four options: (1) students are split up into other classrooms with

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<sup>6</sup> Related reasons filed under professional development absences include days spent visiting other programs and schools. A notable feature of the data we use is that it includes all circumstances when regular teachers are away from classrooms, including professional development (PD) days. This is in contrast to select datasets used in existing research, such as data from New York City or North Carolina, that do not count PD days towards teacher absences.

permanent teachers, 2) a teacher with a prep period covers the class, 3) a school administrator covers the class, or 4) other. The responses provide evidence that schools utilize a number of strategies to address absence coverage and rely on other school employees in the majority of cases. Of 2,131 respondents, 37% identified the first option, while 35% chose the second option. Another 12% of respondents said that a school administrator usually covers the class, while the remaining 16% either had perfect coverage or indicated another form of coverage. Overall, when a substitute does not cover an absent teacher's classroom, another teacher most often bears the burden by taking on additional students. As a result, a teacher's non-covered absence can affect both their colleagues as well as students beyond those in the absent teacher's classroom.

*Research Question 2: How do teacher and absence characteristics predict the probability of coverage?* The likelihood of coverage may vary by teacher attributes. For example, certain teachers might be more likely to reach out to substitutes they know to arrange coverage. To assess the relationship between absence coverage and teacher characteristics, we model coverage as a function of teacher gender, race, subject and grade levels taught, and experience. We start with a parsimonious linear probability model regressing whether an absence is covered by substitutes on teacher gender and race with controls for separate school and year fixed effects. We then gradually add in more teacher characteristics. To estimate the effect of increasing experience on coverage, we also include teacher fixed effects in the final model. This model does not provide insights into different coverage rates for teachers of different gender, race, or ethnicity, which are fixed characteristics, but it does model how coverage increases for each teacher as they gain teaching experience.

Table 3 presents the results. Across models, we find consistent gender and racial and ethnic differences in coverage rates. Female teachers are more likely to have their absences covered. White and, particularly, Asian teachers, are more likely to have their absences covered than are black and Hispanic teachers. Relative to K-5 elementary school teachers, those teaching math, special education, and bilingual education or foreign languages are significantly less likely to find substitute coverage. These estimates are consistent with supply shortages implied by the district's continuing efforts to hire more substitute teachers in these hard-to-staff subjects. Another notable pattern is the disparities in coverage rates by schooling level. Absences among teachers instructing high school are 2.8 percentage points less likely to be covered relative to absences for elementary school teachers.

[Table 3]

Column 3 of Table 3 augments the model by including teacher experience. We code teacher experience using five categories, those with less than 2, 2-3, 4-5, 6-10, or 11 or more years of experience. The omitted category of less than two years of experience encompasses untenured teachers under the current system. Relative to teachers with fewer than two years of experience, absences by teachers with 2-3 years of experience are 1.4 percentage points more likely to be covered, and this difference increases to 3.3 percentage points for teachers with 11 or more years of experience. These estimates represent sizable improvements relative to the baseline non-covered rate of 13% among the least experienced teachers.

As teachers learn on the job and develop relationships with substitute teachers, they may find it easier to find replacement instruction on short notice. Moreover, senior teachers may be absent for different reasons which in turn can affect coverage rates. On the other hand, senior teachers may be different than less experienced teachers in other ways than experience and it

may be these characteristics and not experience itself that leads to the observed differences. The final column of Table 3 investigates whether the variation across teachers with different experience levels has the same relationship with coverage as the variation within a teacher as they gain experience. It does not. Coefficients on all categories of experience shrink in magnitude and become statistically insignificant with the inclusion of teacher fixed effects. Thus, while more experienced teachers have greater coverage, teachers do not appear to develop skills at coverage with experience, such as we might expect if they were developing relationships with individual substitutes that they could draw on for coverage.

Coverage rates may vary depending on the characteristic of the absence or job posting as well as by the characteristics of teachers. For example, if jobs are posted close to their starting time, fewer substitutes may be available. We categorize the time between listing and start time into four categories: 12 hours or fewer, 13-24 hours, 25-100 hours, or more than 100 hours. These categories distinguish among last-minute jobs that are announced after the end of one work day for an absence the following morning, jobs that provide up to a day of lead time, and jobs with more than one day's advanced notice. Table 4 presents these results, along with results assessing the relationship between coverage and both absence spell length and the day of the week in which the spell commences. Jobs that last longer may be more (or less) attractive to substitutes, while proximity to the weekend may also affect the supply of substitute teachers.

Column 1 of Table 4 shows that relative to jobs posted with 100 or more hours before start time, absences beginning within a half day of posting are 22.8 percentage points *less* likely to be covered by a substitute teacher. The analogous estimates for 13-24 hours and 25-100 hours are 8.6 and 3.5 percentage points, respectively. As such, significant improvements in coverage rates are apparent for jobs that have only a few more hours of advanced notice relative to those

advertising for replacement instruction within 12 hours. The marginal change in coverage rates tapers off for jobs with more lead time. Yet even jobs posted 1-4 days in advance are less likely to find substitutes relative to those posted with more lead time.

[Table 4]

To illustrate how coverage evolves with lead time, Figure 3 plots the coverage rate corresponding to the hours between listing and job start times. Vertical lines denote the 12, 24, and 100 hours thresholds. The rate of improvement in coverage rates associated with an additional hour is especially high through the first 24 hours. Jobs posted one or two hours before start time are filled about two-thirds of the time, with coverage rates increasing steadily in lead time. No more than 80% of jobs posted with 12 or fewer hours are filled, suggesting that at least one out of every five jobs posted after the end of the school day for the next morning is not covered by a substitute teacher. With a lead time of one day, the coverage rate is approximately 90%. This increases to around 95% at 100 hours of lead time. The benefits of increasing lead time are less apparent when the job has already been posted for 5 days or a school week. These findings suggest that decreasing the incidence of job postings that provide little advanced notice, such as with less than 24 hours of lead time, may yield a significant improvement in coverage rates.

[Figure 3]

The remaining specifications in Table 4 relate coverage rates to the length of absence spells and the day of the week in which spells begin. Column 2 shows that spells of at least two days are 5.4 percentage points less likely to be covered than one-day jobs. Days of the week are also predictive. Jobs beginning on Mondays have the highest coverage rates, with those that begin on Friday 5.6 percentage points less likely to find a substitute teacher. When the model

incorporates all dimensions of absence characteristics, the coefficients for lead time and day of the week remain significant with similar magnitudes while spell duration is no longer a significant. Column 5 examines how within-teacher variation in absence characteristics relate to coverage outcomes. The estimates are almost identical, suggesting that the amount of lead time given in absence job postings and the day of the week in which jobs begin have a similar effect regardless of individual teacher characteristics. Jobs posted as far in advance as possible and those posted earlier in the week have a greater likelihood of having replacement instructors.

*Research Question 3: How do teacher absences and substitute teacher coverage vary across schools, and to what extent do teacher and absence characteristics explain the school variation?*

We use four dimensions to classify schools: (1) achievement level, (2) proportion of black and Hispanic students, (3) average poverty rates of students' residential Census tracts, and (4) the school district's classification of hard-to-staff institutions which have the greatest difficulty recruiting and retaining teachers. These four aspects complement each other by covering multiple measures of student need and staffing challenges faced by schools.

The first column of Table 5 describes the distribution of teacher absences across different types of schools. Although we find that teacher absences are higher in schools with greater concentrations of black and Hispanic students, schools with the highest average poverty levels, and hard-to-staff schools, the differences are generally small. We do not find significant differences in average teacher absences between higher-achieving and lower-achieving schools. Schools with the highest quartile of black and Hispanic students average one additional day (11% of a standard deviation) of teacher absence relative to the lowest quartile, while teachers in schools with the highest quartile of residential tract poverty levels are absent for about half a day

more (6% of a standard deviation) than teachers in other schools. The difference for hard-to-staff schools and the rest of the schools is even smaller (0.36 days). When disaggregating by absence type as shown in Appendix Table A1, differences are largely driven by more absences due to professional development days at the higher need schools. For example, for schools with the highest and lowest concentrations of black and Hispanic students, the difference of absences due to professional development is 1.39 days, a magnitude even bigger than the difference of total absences. The uneven distribution of absences due to professional development suggests that the small differences in teacher absences are mainly explained by teachers requiring (or being assigned) more training at disadvantaged schools.

Columns (2) and (3) in Table 5 show greater and more consistent disparities across schools in both absence coverage rates and teachers' perceptions of how likely their schools can find substitute teachers when they are absent. Schools in the lowest achievement quartile, schools with the highest shares of minorities or students from lower-income Census tracts, and Hard-to-Staff schools have between 0.9 to 1.3 more non-covered annual absences per teacher than do schools in the most advantaged categories. While lower-needs schools often have 0.3 to 0.7 non-covered absences, the analogous number for higher-needs schools range from 1.3 to 1.6. These differences represent 53% to 77% of a standard deviation in non-covered days, a magnitude much bigger than the differences of teacher absences. Teacher perceptions are consistent with this finding. Specifically, teachers in higher-need schools are much more likely to expect non-covered absences than their peers in other schools. Nearly half of teachers in schools with the highest share of black and Hispanic students reported that their schools are not able or probably not able to find a substitute teacher when they are absent, while only 9% of



teachers in schools with the lowest shares of black and Hispanic students expressed such concerns.

[Table 5]

In sum, Table 5 demonstrates that cross-school disparities in absence coverage are sizable, and that differences in average teacher absences are small and cannot explain these gaps. This finding prompts the question of whether attributes, such as those at the teacher- and absence-level investigated earlier, can explain cross-school differences in absence coverage rates. Table 6 investigates to what extent the differences across schools reduce when accounting for observable differences in school, teacher, and absence characteristics.

[Table 6]

The first column shows four regressions of cross-school disparities in substitute coverage rates, controlling for subject, grade, and year fixed effects. The table presents coefficients corresponding to the least well-off category relative to the most well-off category. For instance, absences in schools in the bottom quartile for math achievement are 9.7 percentage points less likely to find replacement instruction relative to schools in the highest-achieving quartile. Analogous estimates are 9.8 percentage points for share of minority students and 8.8 percentage points for share of students living in poor neighborhoods. Absences in hard-to-staff schools are 6.3 percentage points less likely to be covered relative to other schools.

Columns 2-5 include an increasingly rich set of covariates. First, we condition on school characteristics including grade level (elementary, middle, and high) and a quadratic of school enrollment. Older students may be more or less likely to exhibit disruptive behaviors, thereby making certain age groups less attractive for substitutes. School enrollment size may also affect the appeal of schools. The addition of these covariates reduces coefficients on our focus school

measures by between 10-20% across the four specifications. Further controlling for teacher characteristics such as gender, race, as well as the type of teacher credentials and a quadratic for years of experience in Column 4 attenuates estimates by approximately one-sixth or one-seventh across most specifications. Absences in the lowest-performing, highest minority or poverty quartile schools are between 6.5 and 7.5 percentage points less likely to be covered, relative to the most well-off quartile with these adjustments. Finally, when we include absence characteristics spanning from amount of lead time, spell duration, and day of the week in which absence took place to determine whether cross-school variation along this dimension matters for coverage rates, Column 5 shows little change, suggesting that schools do not systematically differ along this set of absence characteristics in ways that can account for existing disparities in absence coverage rates.

Taken together, these findings provide evidence that cross-school disparities attenuate by about one-quarter or one-third when accounting for measured school, teacher, and absence characteristics. The substantial variation that remains underscores the limitations of relying on administrative data alone and substitute teachers might choose jobs based on factors that we do not commonly observe. The remaining differences across school could be due to differences in schools' approach to recruiting substitutes or to substitutes preferences for schools based on features not captured by the measures in the administrative data. We turn to complementary survey data to explore how substitute teachers' preferences might drive observed disparities in absence coverage.

*Research Question 4: Which factors drive substitute teachers' preferences for or against specific schools, and how do their preferences explain the distribution of non-covered absences across*

*schools?* The evidence in Table 6 suggests that unexplained differences in coverage rates across schools likely contain unobserved factors shaping substitute teachers' decisions such as a school's specific practices in managing teacher absences and supporting replacement instructors. To probe substitute teachers' preferences and how they might explain the unequal distribution of coverage rates, we collected detailed survey data soliciting their most and least preferred schools alongside reasons for their choice.

Our survey data show that substitute teachers consistently prefer one subset of schools while avoiding another subset. The survey elicited these responses by asking substitute teachers to name three district schools that they most prefer to work for (or avoid working for). Appendix Tables A2 and A3 show the number of times each school was nominated either as the most or least favorite among substitute teachers. While the majority of schools received no more than a handful of nominations, eight schools received ten or more nominations as the preferred substitute teacher choice, with one school reaching 33 nominations. Similarly, seven schools received ten or more nominations as the least preferred institution, with one school accumulating 49 nominations. We see no overlap among schools nominated with high frequency for most and least preferred schools, suggesting that substitute teachers are largely in agreement about what constitutes a preferred or disfavored school.

To better understand the relationship between observable school-level characteristics between the most and least preferred schools, we compare some common school attributes in Table 7. These two types of schools do not have statistically significant differences in the number of teacher absences, consistent with our findings when comparing advantaged and disadvantaged schools. Despite comparable teacher absences, the least preferred schools have 2.2 more absences not covered by substitute teachers. They also have significantly lower average

achievement, a higher concentration of black and Hispanic students, higher suspension rates, and are mainly composed of middle schools. While these results indicate an association between school desirability and student achievement, demographics, and other attributes, survey data enables us to probe hard-to-observe factors not present in administrative data.

[Table 7]

To investigate whether the number of nominations for most and least preferred schools contain useful information about the school learning environment not previously captured using school-, teacher-, and job-level attributes, we return to the specification in Table 6. Table 8 begins by replicating the base model in the first column of Table 6 using only 2018 job-level data. Disparities in coverage rates across more and less advantaged schools defined in terms of academic achievement, student composition, and staffing needs are comparable, if not larger, in magnitude for this set of observations relative to the full sample. For example, the lowest-quartile achievement schools are 12.2 percentage points less likely to find replacement instruction for their teacher absences relative to schools in the highest-achieving quartile. Next, we replicate the augmented model in the last column of Table 6 by controlling for a rich set of school-, teacher-, and job-specific attributes. Similar to the results in Table 6, the coefficients decrease by approximately one-quarter to one-third. Lastly, we augment the model with the number of nominations for most or least preferred schools according to substitute teachers. Adding these controls significantly decreases cross-school gaps in coverage rates, sometimes by more than one-half. This implies that these responses are capturing some unobserved characteristics about the school and classroom environment that we are not accounting for using the original set of observable attributes.

[Table 8]

To investigate the substance of these nominations above and beyond characteristics in administrative data, we turn to qualitative comments in the substitute teacher survey. The survey asks respondents what they like best about the school in which they would most like to work, and what they do not like about the school in which they would least like to work. We code responses according to a common rubric covering multiple dimensions of the school context that substitute teachers may take into consideration as they decide whether to fill a particular absence. These include 1) how accessible the school is for substitute teachers in terms of convenience and location, 2) student characteristics such as demographic composition and behavior, 3) school characteristics such as safety and attitudes from teachers, administrators, and staff, 4) resources in the form of lesson plans and logistical support, and 5) the school's environment and culture.

Table A4 shows these five broad categories alongside subcategories contained under each. For example, the convenience and location grouping include distance to the substitute teacher's home, parking, public transportation, and other general considerations such as ease of commute. We mapped each qualitative answer to these subcategories, using up to 8 subcategories to code all aspects of the response. Figure 4 displays the relative frequency of each reason in the qualitative responses to the question of what they like best about their most preferred school. The most common subcategory is teachers, administrators, and staff at nearly 30% of respondents, while the third most common is support from these same individuals. While these two groups likely overlap, the former captures any comments on the dedication, collegiality, friendliness, professionalism, preparation, and general quality of relationship with school administration and staff. The third subcategory codes more explicit mentions of support and help from school staff. In addition to the quality of interactions with school administration and staff, another common response was student behavior. Substitute teachers preferred certain

schools because students were well-behaved, manageable, respectable, and there were few disciplinary problems.

[Figures 4 and 5]

On the flip side, substitute teachers overwhelmingly cited student behavior as an important factor in their determination of certain schools as least preferable (Figure 5). Nearly half of all respondents in our sample mentioned student misbehavior in their open-ended comments, which is more than twice the next most common subcategory. While the descriptions of positive student behavior when listing preferred schools mostly relied on general terms such as “students are well-behaved” to characterize this phenomenon, respondents often went into more detail when describing the types of student misbehavior that render a school least preferable. For example, one substitute teacher described “vulgar and violent language directed at peers and at me, throwing objects around room and out window.” Another said “None of them listened to anything I said. They were extremely loud all day.” Others described disruptive and disrespectful students who made classroom management highly challenging.

The second most common response on what makes a school least preferred is the lack of support from other teachers, administrators, and staff. Multiple substitute teachers mentioned not feeling welcomed, a general lack of professionalism, and having to work in isolation to address student misbehavior and classroom management. Substitutes often mentioned student behavioral problems in conjunction with lack of support, in part because support is especially needed when substitute teachers are compelled to deal with disruptive behaviors. Taken together, these results suggest that the student behavior, coupled with presence of support services from the school’s staff and administration, are important determinants of whether substitute teachers favor working in a particular school.

## **Conclusion and Discussion**

Substitute teachers are a common yet understudied resource in schools. On average, regular teachers in the U.S. are absent around 6% of a school year, which translates to two-thirds of an academic year for children over the course of their K-12 education (Joseph, Waymack, and Zielaski 2014). Research consistently demonstrate that teacher absences are detrimental to student learning (Miller, Murnane, and Willett 2008; Clotfelter, Ladd, and Vigdor 2009; Herrmann and Rockoff 2012). However, researchers know surprisingly little about what happens when teachers are absent from the classroom and the substitute teachers that often take their place, limiting our understanding of how to temper the negative effects of teacher absences. Moreover, qualitative evidence and survey data document severe shortages of substitute teachers across school districts nationwide. This underscores the need for empirical evidence on teacher absences and the substitute teacher workforce to better understand disparities in educational inputs and outcomes.

This paper uses a novel administrative dataset from a large urban school district to address these gaps. We begin by focusing on the prevalence and distribution of absence coverage by substitute teachers and factors accounting for the observed patterns. Of the 11.8 days an average teacher is absent during a school year, over 7% were not covered by a substitute teacher. Nearly three-quarters of surveyed teachers describe students in non-covered classrooms as either being split up into other classrooms or assigned a regular teacher with a prep period. This suggests the burden of substitute teacher shortages falls disproportionately on regular teachers.

In addition to documenting the prevalence of non-covered absences, we show large disparities in the distribution of non-covered teacher absences across schools. Disadvantaged

schools with low average achievement, a high concentration of black and Hispanic students, a large share of students from poor neighborhoods, or are identified by the district as having difficulty with staffing, show much lower coverage rates compared with other more advantaged schools (0.9 to 1.3 more non-covered absences per school year). These are not explained away by differences in the total number of teacher absences, since disadvantaged schools only have a slightly higher incidence of teacher absence. Consistently, teachers in disadvantaged schools are much more likely to express concerns that their school is not able or probably not able to find a substitute teacher for them. For example, nearly 50% of teachers in schools with the highest concentration of black and Hispanic students reported that their schools cannot or are probably not able to find a substitute teacher when they are absent. At the same time, although a number of factors influence coverage rates, ranging from teacher experience to job-level characteristics such as lead time of a job posting and the day of the week an absence starts, they explain no more than one-quarter to one-third of observed disparities in coverage rates across schools.

Our survey data on substitute teachers reveal that their preferences for particular schools depend on hard-to-observe factors that are not in the scope of administrative data. When controlling for the number of times substitute teachers nominate a school as their most or least preferred place to work at, remaining cross-school disparities in absence coverage rates shrink by more than 50% compared with the model that controls for a full set of school-, teacher-, and job-level attributes. Scrutiny of qualitative survey responses shows that student behavior and support from other teachers, administrators and staff are the two most commonly cited reasons for favoring or avoiding specific schools. While the reasons for preferring a school are relatively diverse, student misbehavior far exceeds the other reasons and is the most important factor for substitute teachers to avoid certain schools. Our research suggests that institutional efforts to



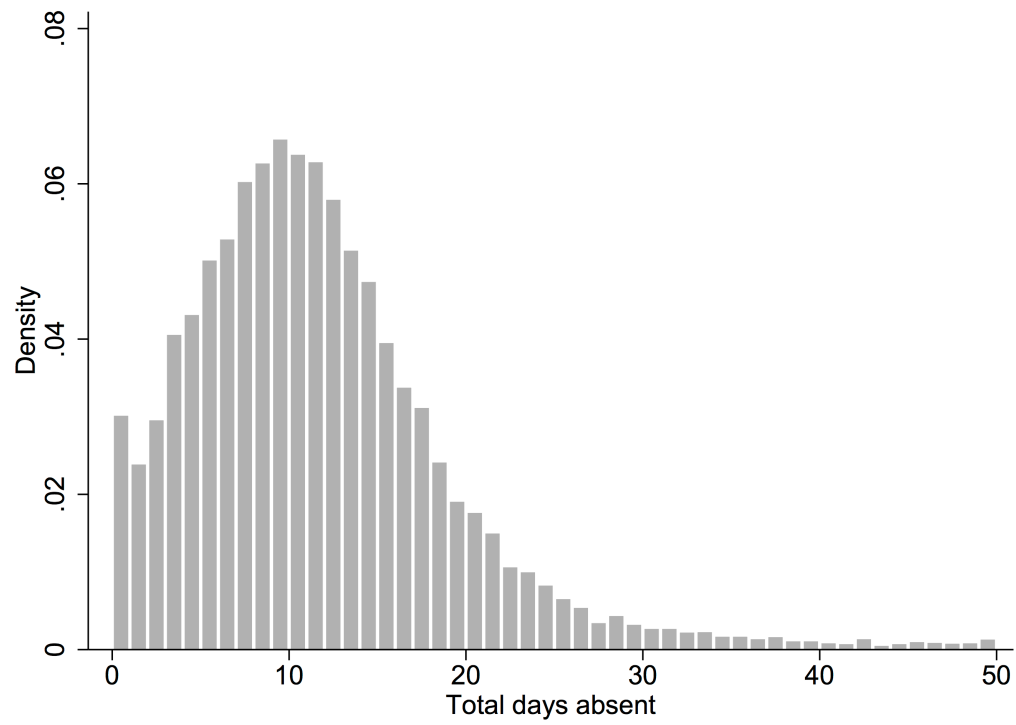
provide more support for substitute teachers, for example initiatives that curb misbehavior and provide substitutes with more classroom management tools, merit closer attention.

When substitute teachers are unavailable, regular teachers are most likely to step in for their colleagues. To the extent that these expanded job responsibilities take a toll, the teachers most likely to be affected are those in disadvantaged schools. In addition to a greater concentration of less qualified teachers, the higher rates of non-covered absences at these institutions can further exacerbate existing inequalities. Our research thus highlights the importance of developing policies to close these disparities. Evidence that coverage rates increase in lead time, with 24 hours of advanced notice associated with a significant jump in coverage, suggests that gains are possible by planning around the posting of absences and their allocation across classrooms and time. Future research is needed to investigate the consequences of non-covered teacher absences for teacher and staff turnover, and explore whether concentrated under-coverage exacerbates existing achievement gaps.

## References

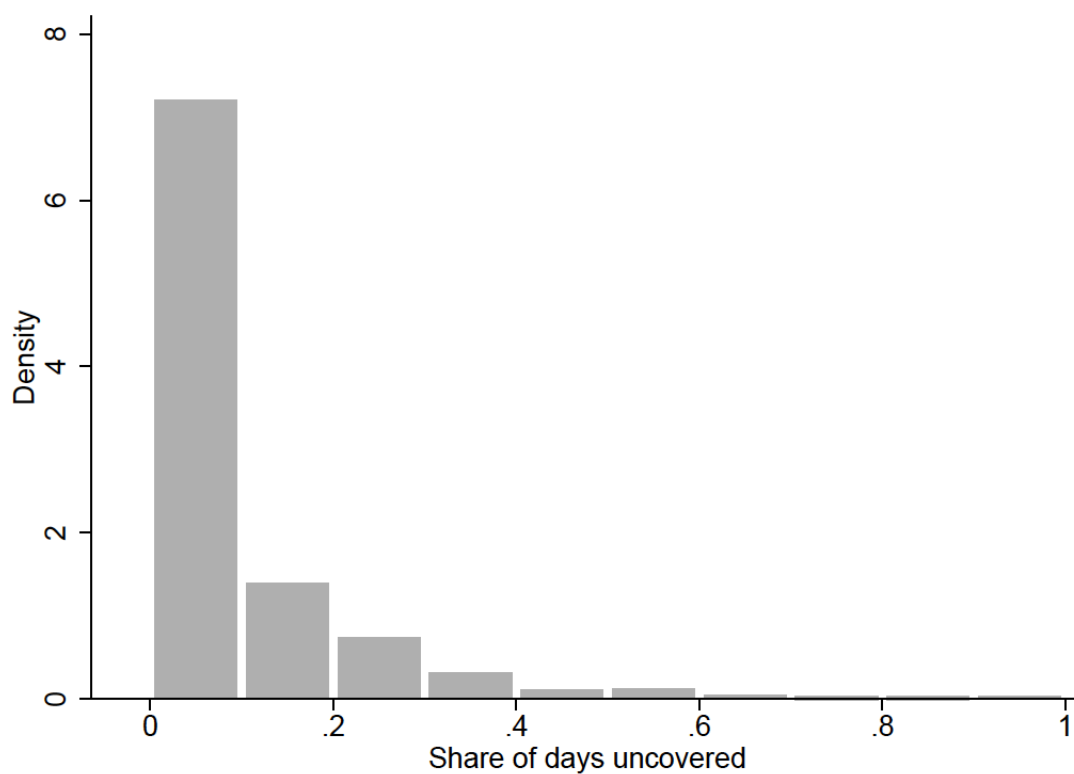
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Figure 1 Distribution of Annual Teacher Absences



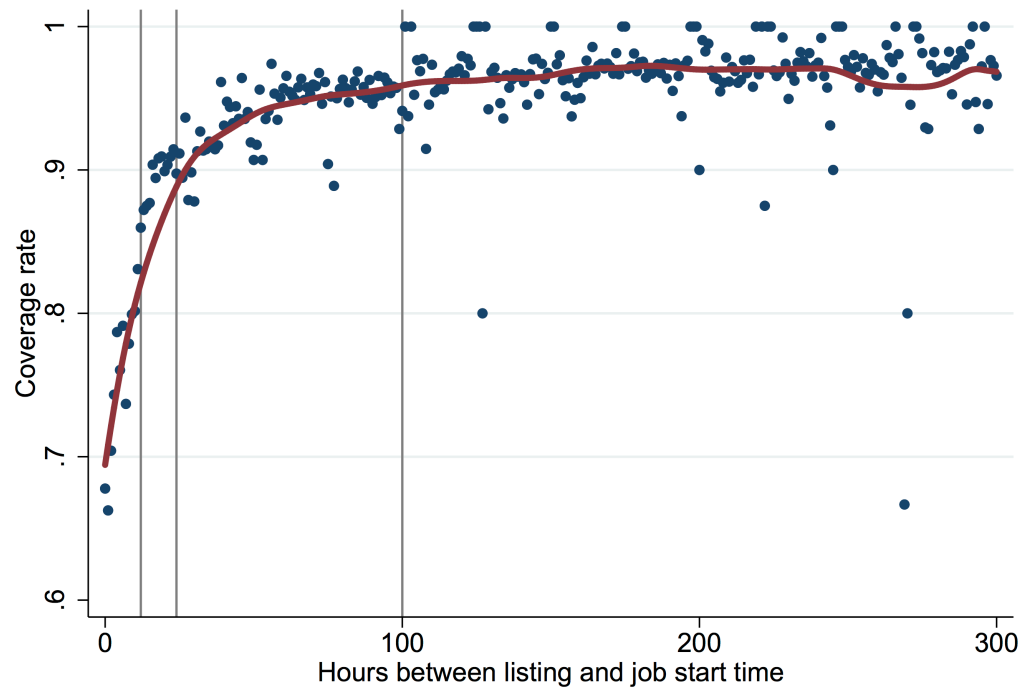
*Notes:* Sample uses teacher-by-year observations for school years 2012-2018. Observations are truncated at 50 observations.

Figure 2 Distribution of the Share of Non-covered Absences



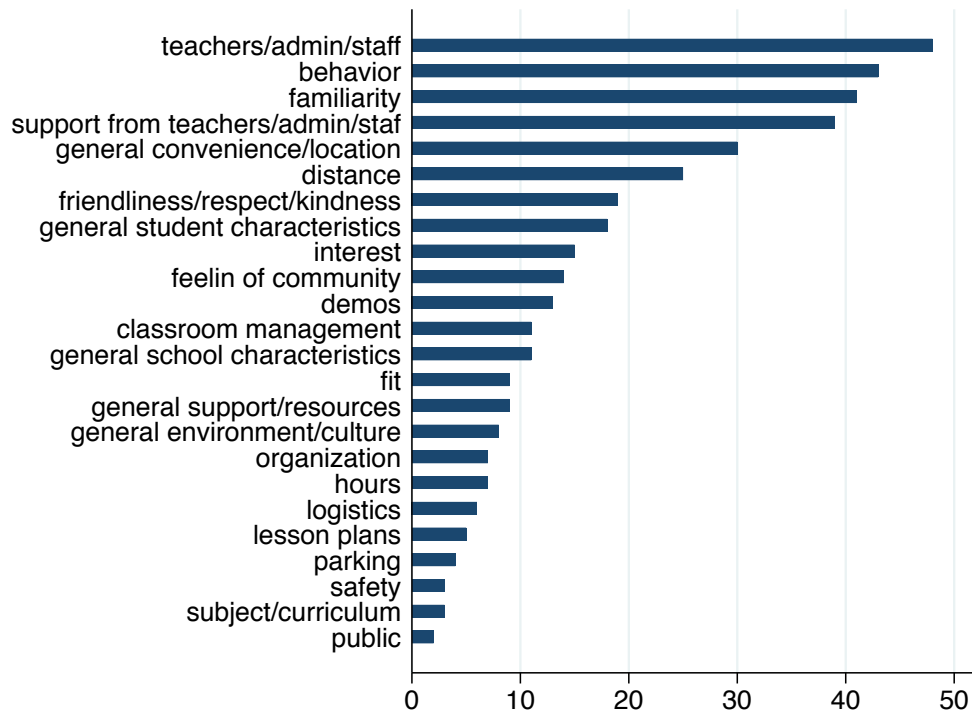
*Notes:* Sample uses teacher-by-year observations for school years 2012-2018.

Figure 3 Correspondence between Listing Time and Coverage Rates



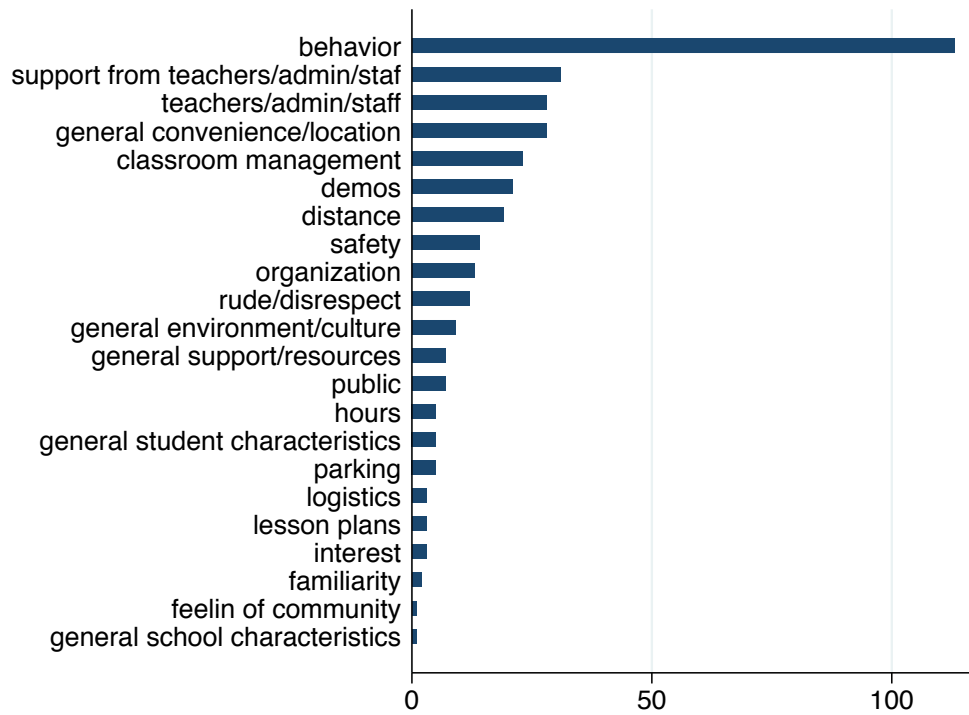
*Notes:* The sample includes job-level observations from 2012-2018.

Figure 4 Substitute Teacher Reasons for Designating a Favorite School



*Notes:* Using substitute teacher-by-year observations for school years 2012-2018. N=395.

Figure 5 Substitute Teacher Reasons for Designating a Least Favorite School



Notes: Using substitute teacher-by-year observations for school years 2012-2018. N=354.

Table 1 Descriptive Statistics: Teachers and Substitutes

	Regular teachers	Substitute teachers
Teacher level characteristics		
Female	0.68 (0.47)	0.64 (0.48)
White	0.47 (0.50)	0.50 (0.50)
Black	0.05 (0.22)	0.07 (0.25)
Hispanic	0.14 (0.35)	0.11 (0.31)
Asian	0.21 (0.41)	0.21 (0.40)
Other	0.04 (0.19)	0.01 (0.09)
Missing race	0.08 (0.28)	0.11 (0.31)
Age	40.14 (12.06)	43.12 (16.37)
Years of teaching experience	8.46 (7.80)	N/A
<i>Observations</i>	<i>5,264</i>	<i>1,873</i>
Teacher-year level characteristics		
Days substituted	-	45.81 (39.84)
<i>Observations</i>		<i>4,542</i>

*Notes:* Sample in top panel pools teacher level observations for school years 2012-2018. Sample in bottom panel uses teacher-year level observations during the same time period.



Table 2 Descriptive Statistics – Teacher Absences

	Count	Share
Total absences	11.83 (10.02)	
Leave reason		
Sick leave	4.87 (8.21)	36.89 (31.07)
Personal leave	2.93 (4.10)	27.48 (27.25)
PD/Permission day	3.44 (3.48)	31.65 (27.64)
Other administrative leave	0.59 (2.86)	3.97 (12.28)
Total absences not covered	0.87 (1.62)	7.48 (13.11)
Observations	18,988	18,988

*Notes:* Standard deviations are in parentheses. Other administrative leave includes include bereavement, jury duty, administrative leave, legal purposes, and special assignment military. The difference in total observations between count and share is attributed to 566 teacher-year observations with zero absences.

Table 3 Teacher Characteristics and Absence Coverage Rate

	(1)	(2)	(3)	(4)
		Not covered		
Female teacher	-0.007*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	
Black teacher	0.013** (0.005)	0.014*** (0.005)	0.014*** (0.005)	
Hispanic teacher	0.006* (0.003)	0.008** (0.003)	0.006** (0.003)	
Asian teacher	-0.010*** (0.003)	-0.007*** (0.002)	-0.007*** (0.002)	
Subject: math		0.015** (0.007)	0.012* (0.007)	0.004 (0.009)
Subject: English		0.006 (0.008)	0.004 (0.008)	-0.003 (0.008)
Subject: science or soc. sci.		0.004 (0.007)	0.002 (0.007)	-0.006 (0.007)
Subject: special education		0.052*** (0.006)	0.046*** (0.006)	0.016* (0.009)
Subject: bilingual ed/FL		0.020*** (0.005)	0.018*** (0.005)	0.019*** (0.003)
Grades 6-8		0.021 (0.013)	0.020 (0.013)	-0.007 (0.009)
Grades 9-12		0.028*** (0.008)	0.028*** (0.007)	0.027*** (0.008)
2-3 years			-0.014** (0.005)	-0.004 (0.005)
4-5 years			-0.026*** (0.005)	-0.000 (0.006)
6-10 years			-0.028*** (0.005)	0.009 (0.008)
11+ years			-0.033*** (0.005)	0.012 (0.009)
Teacher fixed effects				X
Observations	225030	225030	225030	225030

*Notes:* The sample at the absence job level spans 2012-2018. Omitted categories are male teachers, white teachers, those teaching K-5 subjects, elementary grades K-5, and teachers with less than 2 years of experience. Included variables not shown in the table are: teachers of other races, teachers in art or music or PE, and teachers in other subjects. All models include separate school and year FE. The first three specifications cluster standard errors at the school level, while the last clusters at the teacher level. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Table 4 Absence Coverage and Absence Characteristics

	(1)	(2)	(3)	(4)	(5)
			Not covered		
<= 12 hours	0.228** (0.015)			0.228** (0.015)	0.224** (0.014)
13-24 hours	0.086** (0.006)			0.081** (0.006)	0.082** (0.006)
25-100 hours	0.035** (0.003)			0.030** (0.003)	0.030** (0.003)
Spell of 2 or more days		-0.054** (0.004)		0.001 (0.002)	0.003 (0.002)
Spell starts on Tuesday			0.016** (0.003)	0.019** (0.003)	0.019** (0.003)
Spell starts on Wednesday			0.010** (0.003)	0.015** (0.003)	0.015** (0.003)
Spell starts on Thursday			0.024** (0.003)	0.033** (0.004)	0.033** (0.004)
Spell starts on Friday			0.056** (0.005)	0.054** (0.005)	0.054** (0.005)
Grade FE	X	X	X	X	X
Year FE	X	X	X	X	X
School FE	X	X	X	X	X
Teacher FE					X
Observations	219226	219226	219226	219226	219226

Notes: The sample at the absence job level spans 2012-2018. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Table 5 Cross-School Disparities in Absence and Coverage

	(1)	(2)	(3)	(4)	(5)
	Total absences	Absences not covered	Perceived difficulty of finding subs	N (admin data)	N (survey data)
All schools	11.83	0.87	0.22	18,988	1,897
<i>Average achievement in math</i>					
Top quartile	11.67	0.33	0.10	4,714	481
Middle quartiles	11.94	0.89***	0.22***	10,106	983
Bottom quartile	11.67	1.31***	0.35***	3,708	340
<i>Percentage minority</i>					
Bottom quartile	11.36	0.34	0.09	5,616	518
Middle quartiles	11.89***	0.87***	0.20***	9,715	1,054
Top quartile	12.43***	1.59***	0.49***	3,197	255
<i>Percentage below poverty level</i>					
Bottom quartile	11.89	0.34	0.1	4,632	497
Middle quartiles	11.61*	0.87***	0.25***	10,733	927
Top quartile	12.45*	1.43***	0.27***	3,163	403
<i>Hard-to-staff schools</i>					
No	11.74	0.67	0.17	14,713	1,463
Yes	12.10*	1.53***	0.39***	4,275	364

Notes: Middle quartiles include the second and third quartiles for each measure. Percentage minority is the share of the school's student population that is black or Hispanic. The percentage below poverty level measure is the school-level average of the percent of all those 18 and under in students' Census tracts who are below the poverty level. The survey question asks teachers whether their school is able to find a substitute teacher when they are away. A response of "no" or "probably not" is coded as 1, and a response of "probably" and "yes" is coded as 0. Stars indicate significance levels of the t-test measuring differences between the bottom quartile and remaining quartiles. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Table 6 Cross-School Disparities in Coverage Rates

	(1)	(2)	(3)	(4)	(5)
			Not covered		
Bottom quartile achievement school	0.097*** (0.012)	0.086*** (0.011)	0.079** (0.011)	0.074*** (0.011)	0.074*** (0.009)
Top quartile percentage minority school	0.098*** (0.012)	0.088*** (0.013)	0.081*** (0.012)	0.075*** (0.012)	0.073*** (0.011)
Top quartile perc. below poverty level school	0.088*** (0.013)	0.072*** (0.013)	0.068*** (0.012)	0.065*** (0.012)	0.065*** (0.011)
Hard-to-staff school	0.063*** (0.010)	0.051*** (0.010)	0.047*** (0.010)	0.042*** (0.009)	0.038*** (0.009)
Year FE	X	X	X	X	X
Grade FE	X	X	X	X	X
Subject FE	X	X	X	X	X
School characteristics		X	X	X	X
Teacher demographics			X	X	X
Teacher credentials & experience				X	X
Absence characteristics					X
Observations	213475	213475	213475	213475	213475

*Notes:* The sample at the absence job level spans 2012-2018. Each coefficient corresponds to a separate regression, with the omitted category as the most advantaged group (top quartile achievement, lowest quartile minority, lowest quartile percent below poverty level, non-Hard-to-Staff school). School characteristics include indicators for type (elementary, middle, or high) and a quadratic of school enrollment. Teacher characteristics include demographic characteristics (sex and race/ethnicity), teacher credentials (single vs. multiple subjects, ELL, special education, English, math, and science), and a quadratic of teacher experience. Absence characteristics include indicators for the job being listed 12 hours before start time, between 13-24 hours, and between 25-100 hours, spell length of two or more days, and the day of week in which the spell began. All specifications cluster standard errors at the school level. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Table 7: Comparing Least Favorite and Favorite Schools

	(1)		(2)		
	Least Favorite Schools		Favorite Schools		
	Mean	SD	Mean	SD	P-value
Teacher absences	11.02	.93	12.17	4.84	.55
Non-covered absences	2.64	.71	.46	.33	.00
Math scores	-.70	.30	.32	.24	.00
ELA scores	-.59	.22	.32	.25	.00
White	.04	.04	.26	.18	.01
Black	.14	.13	.05	.03	.06
Hispanic	.58	.24	.23	.13	.00
Asian	.20	.19	.42	.24	.07
Suspension	.17	.15	.05	.05	.04
Hard-to-staff	.86	.38	.00	.00	.00
Middle school	.71	.49	.00	.00	.00
High School	.00	.00	.63	.52	.01

Notes: The comparisons are made at the school-year level. Least favorite schools include seven schools that were nominated by substitute teachers for at least 10 times as schools they would avoid to work at. Favorite schools include eight schools that were nominated for at least times as schools they prefer to work at. These two types of schools do not overlap.

Table 8 Cross-School Disparities in Coverage Rates – 2018 data

	(1)	(2)	(3)
	Not Covered		
Bottom quartile achievement school	0.122*** (0.017)	0.091*** (0.013)	0.058*** (0.014)
Top quartile percentage minority school	0.118*** (0.016)	0.087*** (0.015)	0.051*** (0.015)
Top quartile perc. below poverty level school	0.107*** (0.020)	0.075*** (0.015)	0.051*** (0.013)
Hard-to-staff school	0.087*** (0.015)	0.057*** (0.012)	0.026** (0.011)
Year FE	X	X	X
Grade FE	X	X	X
Subject FE	X	X	X
School characteristics		X	X
Teacher demographics		X	X
Teacher credentials & experience		X	X
Absence characteristics		X	X
No. of times nominated as favorite or least favorite school in survey			X
Observations	31278	31278	31278

*Notes:* We restrict the sample to absence jobs in 2018. Each coefficient corresponds to a separate regression, with the omitted category as the most advantaged group (top quartile achievement, lowest quartile minority, lowest quartile percent below poverty level, non-Hard-to-Staff school). School characteristics include indicators for type (elementary, middle, or high) and a quadratic of school enrollment. Teacher characteristics include demographic characteristics (sex and race/ethnicity), teacher credentials (single vs. multiple subjects, ELL, special education, English, math, and science), and a quadratic of teacher experience. Absence characteristics include indicators for the job being listed 12 hours before start time, between 13-24 hours, and between 25-100 hours, spell length of two or more days, and the day of week in which the spell began. All specifications cluster standard errors at the school level. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

## APPENDIX

Table A1 Cross-School Disparities in Different Types of Absences

	(1)	(2)	(3)	(4)	(5)	(6)
	Total absences	Sick leave	Personal leave	Professional development	Other admin	N
All schools	11.83	4.87	2.93	3.44	0.59	18,988
<i>Average achievement in math</i>						
Top quartile	11.67	4.66	2.68	3.28	1.05	4,714
Middle quartiles	11.94	5.06	2.95***	3.49*	0.45***	10,106
Bottom quartile	11.67	4.71	3.09***	3.46*	0.40***	3,708
<i>Percentage minority</i>						
Bottom quartile	11.36	4.87	2.53	3.02	0.94	5,616
Middle quartiles	11.89***	5.09**	3.00***	3.35***	0.45***	9,715
Top quartile	12.43***	4.31**	3.30***	4.41***	0.42***	3,197
<i>Percentage below poverty level</i>						
Bottom quartile	11.89	4.69	2.74	3.35	1.11	4,632
Middle quartiles	11.61*	5.02	2.87***	3.29***	0.43***	10,733
Top quartile	12.45*	4.74	3.30***	4.01***	0.40***	3,163
<i>Hard-to-staff schools</i>						
No	11.74	4.92	2.83	3.37	0.64	14,713
Yes	12.10*	4.71	3.28***	3.69***	0.43***	4,275

Notes: Middle quartiles include the second and third quartiles for each measure. Percentage minority is the share of the school's student population that is black or Hispanic. The percentage below poverty level measure is the school-level average of the percent of all those 18 and under in students' Census tracts who are below the poverty level. Stars indicate significance levels of the t-test measuring differences between the bottom quartile and remaining quartiles. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.



Table A2 Number of Times a School is Nominated as Favorite

# of Nominations	(1) # of Schools	(2) Percent	(3) Cumulative Per.
0	18	14.63	14.63
1	26	21.14	35.77
2	25	20.33	56.10
3	10	8.13	64.23
4	13	10.57	74.80
5	12	9.76	84.55
6	4	3.25	87.80
7	2	1.63	89.43
8	3	2.44	91.87
9	2	1.63	93.50
10	3	2.44	95.93
11	1	0.81	96.75
13	1	0.81	97.56
14	1	0.81	98.37
20	1	0.81	99.19
33	1	0.81	100.00
Total	123	100.00	

*Notes:* Sample includes substitute teacher respondents to the 2018 survey. The table aggregates the number of nominations received by each of the 123 schools in response to the question “If you could work for any school as a substitute teacher, what would it be?”

Table A3 Number of Times a School is Nominated as Least Favorite

# of Nominations	(1) # of Schools	(2) Percent	(3) Cumulative Per.
0	41	33.33	33.33
1	30	24.39	57.72
2	10	8.13	65.85
3	12	9.76	75.61
4	3	2.44	78.05
5	8	6.50	84.55
6	3	2.44	86.99
7	6	4.88	91.87
8	2	1.63	93.50
9	1	0.81	94.31
10	1	0.81	95.12
11	1	0.81	95.93
12	2	1.63	97.56
19	1	0.81	98.37
31	1	0.81	99.19
49	1	0.81	100.00
Total	123	100.00	

*Notes:* Sample includes substitute teacher respondents to the 2018 survey. The table aggregates the number of nominations received by each of the 123 schools in response to the question “If you could avoid working for any school as a substitute teacher, what would it be?”

Table A4 Qualitative Response Categories

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**Convenience and location**

General (e.g. ease of commute)  
Distance to home  
Parking  
Public transportation

**Student characteristics**

General  
Behavior  
Demographics  
Interest and motivation

**School characteristics**

General  
Hours  
Subject or curriculum  
Safety and behavioral management  
Teachers, administrators, and staff

**Support and resources**

General  
Organization  
Classroom management  
Support from teachers/administrators/staff  
Lesson plans  
Logistics (written instructions, keys, storage, schedule, etc)

**Environment and culture**

General  
Friendliness/kindness/respect  
Feeling of community

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*Notes:* Categories correspond to substitute teacher responses to two survey questions 1) What do you like best about the school in which you would most like to work? and 2) What don't you like about the school in which you would least like to work?