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The Decline in Teacher Working Conditions During and After the COVID Pandemic

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We study changes to teacher working conditions from 2016-17 to 2022-23, covering school years before, during, and after the COVID pandemic. We show working conditions were improving leading into the pandemic but declined when the pandemic arrived. Perhaps more surprisingly, the pandemic was not a low point: teacher working conditions have continued to decline during the post-pandemic period. Teachers report worsening working conditions along many dimensions including the level of classroom disruptions, student responsibility, and safety, among others. They also report declines in trust between themselves and principals, parents, and other teachers. Trends in working conditions since the pandemic are similar in schools serving more and less socioeconomically advantaged students. However, schools in districts where online learning was the predominant mode of instruction during the 2020-21 school year have experienced larger declines than other schools.

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1. Introduction

Teacher working conditions are highly correlated with job satisfaction, intentions to remain in the profession, and turnover (Geiger and Pivovarova, 2018; Kraft, Marinell, and Shen-Wei Yee, 2016; Redding and Nguyen, 2024; Simon and Johnson, 2015), and teachers often report valuing working conditions over other important aspects of their jobs, including their salaries and the socioeconomic status of their students (Horng, 2009; Johnson, Kraft, and Papay, 2012). The COVID pandemic brought unprecedented and abrupt changes to schools, but to date little is known about how teacher working conditions changed. We contribute to the literature by providing new evidence on trends in teacher working conditions before, during, and after the COVID pandemic.

When the pandemic began in March of 2020, most schools closed and remained closed for the remainder of the 2019-20 school year. In 2020-21, schools operated in an uncertain environment and used different modes of instruction, often switching between in-person, hybrid, and fully remote learning during the school year (Goldhaber et al., 2023; Jack and Oster, 2023). Due to the abrupt nature of COVID's arrival, the changes to school operations happened without advanced warning, causing a myriad of issues. For instance, teachers were not provided adequate technological or pedological training to support the transition to online teaching and students did not always have access to the technology necessary to switch between learning modes. On top of the stress caused by the health and social effects of COVID-19, it was a demanding period for teachers professionally (Kraft, Simon, and Lyon, 2021).

Other changes also occurred that affected schools at the same time, some related to COVID-19 and others unrelated. An example of a related change is the decline in academic standards, presumably brought on by concerns about student well-being during the pandemic. Standards have recovered some since the pandemic but have not fully rebounded (Goldhaber and Young, forthcoming; Lemov, 2024; Sanchez, 2023). Another example is that student enrollment

and attendance dropped during the pandemic and have yet to return to their pre-pandemic levels (Dee, 2023).

The world outside of schools also changed in important ways. The murder of George Floyd in May of 2020 created widespread social unrest across the U.S., which likely affected school environments in complex ways. In addition, the labor market tightened coming out of the pandemic, leading to increases in occupational mobility and staffing shortages economywide, including in public schools. Finally, many other factors, measured and unmeasured, may have contributed to changes in teacher working conditions during the period spanning the COVID pandemic.

In the context of this period of change, we document trends in teachers' self-reported working conditions from 2016-17 through 2022-23. Our data are from the 5Essentials Survey in Illinois (hereafter, the 5E Survey). The 5E survey is a rich survey covering many aspects of the conditions in schools and has been administered to teachers and students in Illinois for many years. Beginning with the 2018-19 school year, the 5E Survey was incorporated into Illinois' Every Student Succeeds Act (ESSA) plan as the state's instrument for assessing learning conditions. As a result, the 5E survey has high coverage of Illinois schools and a high teacher response rate, reducing concerns about biased inference due to sample selection into the survey.

We find teacher working conditions declined substantially from 2016-17 and 2022-23. The declines are concentrated between 2018-19 and 2022-23, during and after the pandemic. Over this timespan, just 2 of the 20 indicators of working conditions on the 5E Survey trend positively. Of the remaining indicators that trend negatively, many imply precipitous declines in working conditions. Teachers report worsening conditions along dimensions including safety, student responsibility and disruptiveness, and instructional leadership, among others. They also report declines in trust between themselves and principals, parents, and other teachers. The declines in teacher working conditions along some dimensions coincide with the onset of the COVID pandemic, which is not surprising. However, along many dimensions, the largest declines occur after the pandemic, between the 2020-21 and 2022-23 school years.

We test for heterogeneity in the trends by (a) the socioeconomic status (SES) of the school's students and (b) mode of instruction during the 2020-21 school year, when the COVID disruption in schools was largest. More advantaged schools have better working conditions in levels, but the declines in working conditions during and after the pandemic are similar in high- and low-SES schools. Schools in districts where more instruction was online during the 2020-21 school year had significantly larger declines in teacher working conditions compared to schools where more instruction was in-person.

Our study is descriptive and not designed to identify the causal mechanism(s) underlying the decline in teacher working conditions. However, despite our inability to attribute the changes in teacher working conditions causally to any particular event, we paint a concerning portrait of the post-pandemic work environment in public schools. Absent intervention, our findings give no indication that working conditions will rebound naturally now that the pandemic is behind us.

2. Background

Research identifies teacher self-efficacy as a key mediating factor between working conditions and teacher outcomes, such as job satisfaction and turnover (Johnson and Birkeland, 2003; Tschannen-Moran, Hoy, and Hoy, 1998). Consistent with this, when teachers are surveyed about the aspects of their jobs they value most, they often emphasize aspects related to the work culture, such as effective leadership and a collaborative work environment, or aspects related to professional development resources, such as strong teacher support systems and more time for planning (Grissom, Viano, and Selin, 2015; Johnson, Kraft, and Papay, 2012; Simon and Johnson, 2015). Teachers place less value on the level of socioeconomic advantage of their students *per se*; while it is true that turnover rates are higher in schools serving more disadvantaged student populations, research suggests this relationship is driven largely by correlated school-culture and resource-based differences across schools (Grissom, 2011; Horng, 2009; Johnson, Kraft, and Papay, 2012; Loeb, Darling-Hammond, and Luczak, 2005).

When the COVID pandemic arrived in March of 2020, school operations were thrown into turmoil. Many of the professional supports and interactions teachers value disappeared.

Instruction shifted online without time for teachers or students to prepare. Teachers' daily roles were expanded in broad and unclear ways. One might expect teacher working conditions and job satisfaction to have deteriorated during the pandemic, but there is surprisingly little empirical evidence to support this contention. For instance, Redding and Nguyen (2024) report trends of several indicators of working conditions and job satisfaction from the Schools and Staffing Survey and do not find clear evidence of worsening conditions between 2016 and 2021 (the two most recent waves of the survey). Some of their indicators improve, and some worsen, between these periods. In the context of a long-run analysis of trends in teacher job satisfaction (among other aspects of the profession), Kraft and Lyon (2024) show some evidence of declines in satisfaction coinciding with the pandemic. However, the declines are not consistent across all surveys they examine. In addition, many of the surveys are too intermittent to detect a trend change narrowly around the pandemic.[1]

In the post-pandemic period there is even less evidence to draw on and what evidence is available is mixed. A survey conducted by EdChoice (2024) reports generally declining trends since the pandemic in the fraction of teachers who believe "things in K-12 education are generally going in the right direction" and who "would recommend teaching to a friend or family member." In contrast, Doan, Steiner, and Pandey (2024) find teachers' levels of job-related stress and depression symptoms declined from 2021 to 2024. These studies focus on teacher job satisfaction and well-being, but do not analyze working conditions directly.

3. Data, Research Setting, & Methods

3.1 Data Overview

Our data are from the 5E Survey in Illinois, which elicits detailed feedback from students and teachers on the conditions in schools. The 5E Survey was incorporated into Illinois' ESSA plan under Public Act 100-1046, just before the commencement of the 2018-19 school year

[1] Related to these studies is Kraft, Simon, and Lyon (2021), who use cross-sectional data during the pandemic to explore the relationship between mode of instruction during the COVID pandemic and teacher self-efficacy. These authors show that online learning is strongly associated with reduced teacher self-efficacy. Per the above discussion, this can be viewed as an indirect indicator of poor working conditions.

(hereafter, we refer to school years by the spring year—e.g., 2018-19 as 2019). Subsequently it has become an annual fixture in most public schools statewide, save for the year 2020 when the onset of the COVID pandemic disrupted school operations during the survey window in the spring. The 5E survey was also administered in Illinois prior to 2019, but not as comprehensively.

We merge the 5E Survey data with federal data on school and district characteristics. At the school level, we merge information on enrollment and student demographic and socioeconomic attributes from the Common Core of Data (CCD) for each school in each year. We also merge in data on school neighborhood poverty, which is a geospatial estimate of local-area poverty provided by the National Center for Education Statistics (NCES). Our version of school neighborhood poverty is manipulated mathematically following Fazlul, Koedel, and Parsons (2023) to provide an estimate of the fraction of students in a school from families with incomes at or below 130 percent of the poverty line. We follow their terminology and refer to this poverty measure as IPR(130).[2]

At the district level, we merge in each district's local-area median household income and average education level (among parents with children) from NCES's Education Demographic and Geographic Estimates (EDGE) program. The EDGE data are sourced from the American Community Survey, averaged over the years 2017-2021 (this is the data range available in EDGE that is closest in coverage to the years of our 5E Survey data panel). Finally, we merge in district-level information on schools' modes of instruction in the 2020-2021 school year. The mode-of-instruction data are from the COVID-19 School Data Hub.[3]

Table 1 documents coverage of the 5E Survey dataset over our study period from 2017-2023. The first vertical panel compares school coverage of the 5E Survey to all schools listed in

[2] Fazlul, Koedel, and Parsons (2023) show that free and reduced-price lunch enrollment, which is commonly used to measure poverty status, overstates poverty significantly.

[3] We report district averages based on monthly school enrollment data by learning mode collected by the Illinois State Board of Education and aggregated to annual averages by the COVID-19 School Data Hub (Accessed on 04.23.2024 at: https://www.covidschooldatahub.com).

the CCD in Illinois, unweighted and weighted by student enrollment. Focusing first on the data from 2019 onward, the first four rows of the table show between 77 and 80 percent of schools listed in the CCD are in the 5E Survey dataset each year, and that these schools account for 90 to 93 percent of total student enrollment in Illinois. Missing schools are mostly small, and a mix of schools that are truly missing and schools for which data are suppressed in the 5E Survey due to small teacher sample sizes (i.e., N<8 teachers).

The second vertical panel of the table documents teacher participation in the 5E Survey conditional on school participation. The teacher response rate ranges from 75-82 percent annually from 2019-2023. This is on par with Kraft, Simon, and Lyon (2021), and higher than most similar surveys.[4] On average from 2019 to 2023, our data are comprised of survey responses from approximately 127,000 individual teachers working in 3,500 schools annually.[5]

The bottom two rows of Table 1 report on the 2017 and 2018 survey data, which predate the incorporation of the 5E Survey into Illinois' ESSA plan. We use data from these years to establish pre-COVID trends, leading into our main analysis from 2019-2023. The pre-2019 survey coverage rates are much lower, at about 55 percent of enrollment-weighted schools in each year.[6] In addition, in the appendix we show that while the pre-2019 school sample is broadly similar to the full sample of Illinois schools, there are some differences along socioeconomic dimensions. We address these differences in 2017 and 2018 by re-weighting the data in these years so the teacher sample is a better match with the 2019 data in terms of employment at low-income and high-minority schools. Details on the reweighting procedure are

[4] For instance, Redding and Nguyen (2024) report the teacher response rate to the Schools and Staffing Survey—a high-quality and widely used survey dataset of teachers—was 62 percent in 2021. Response rates to other surveys that ask similar types of questions about working conditions are often in the 50s when they are reported (EdChoice, 2024; Horng, 2009), though a surprising number of studies do not directly report response rates.

[5] The 5E Survey uses a broad definition of "teacher" that includes case managers, counselors, social workers, instructional coaches, librarians, reading specialists, speech-language pathologists, teacher aides, paraprofessionals, and special education classroom assistants. For ease of presentation, we refer to this broad group who receive the teacher portion of the 5E Survey as "teachers."

[6] Prior to 2019, schools were required to administer a learning-conditions survey every other year under different legislation (Public Act 097-0008). Interestingly, the teacher response rates are even higher conditional on working in a covered school in 2017 and 2018—in the range of 85-87 percent—but because many fewer schools participated each year, total teacher coverage is lower.

provided in Appendix A (see Appendix Table A1). The re-weighting procedure increases comparability between the pre- and post-2019 survey data and permits a lengthier investigation of the trends in teacher working conditions in Illinois.

3.2 Illinois Context

Table 2 compares Illinois students, schools, and districts to the nation using the CCD. The comparison is from 2019, the year prior to the pandemic. We also report data on mode of instruction in 2021.

The first panel of Table 2 shows the racial/ethnic make-up of the Illinois student population is 47 percent White, 27 percent Hispanic, 17 percent Black, and 5 percent Asian. These racial/ethnic shares are close to the national averages. The second panel shows enrollment in charter schools is below the national average in Illinois (3.2 versus 6.5 percent), and school neighborhood poverty is similar to the national average (at about 31 versus 32 percent nationally). At the district level, the third panel shows the average Illinois student attends a school district where families have lower median household incomes than the national average ($54,500 versus $65,700) and less educated parents (39.8 versus 42.6 percent of parents with a bachelor's degree or higher).

The bottom panel of the table shows that during the 2020-21 school year, students in Illinois schools spent, on average, about 24 percent of their school time in-person, 41 percent of their time in hybrid learning, and the remaining 35 percent of their time online. Compared to the national averages, these numbers indicate the COVID pandemic was more disruptive to schools in Illinois. Indeed, Goldhaber et al. (2023) report Illinois was in the top quartile of states in terms of the average number of weeks of remote learning during the 2020-21 school year. It is important context that schools in Illinois were more disrupted than in the average state by COVID-19. However, we again note we cannot attribute the changes in teacher working conditions we document entirely to this aspect of the Illinois landscape. There were many changes that occurred inside and outside of schools during the period from 2017 to 2023.

3.3 Measuring Teacher Working Conditions

The 5E Survey elicits feedback from both students and teachers about conditions in their schools. The results are reported at three levels of increasing aggregation: Measures, Essentials, and an Essentials Summary Score. All of these combine information from multiple individual survey questions. The lowest level of aggregated responses is a Measure. Examples of Measure topics related to teacher working conditions include "Teacher Safety" and "Instructional Leadership." Essentials aggregate over Measures to form five large categories of learning conditions in schools: Effective Leaders, Collaborative Teachers, Involved Families, Supportive Environment, and Ambitious Instruction (Sebring et al., 2006). The Essentials Summary Score is a singular, summative indicator of school conditions that incorporates all survey items.

Given our interest in teacher working conditions, we focus on Measures that summarize teacher-directed items. The Measures are constructed by the survey developers using Rasch analysis (Hart et al., 2020), which is a method for combining information across multiple survey items and respondents that accounts for imprecision due to a variety of factors. Examples include inattentiveness of survey respondents and variability in the informativeness of individual questions. For instance, Rasch analysis down-weights responses from teachers who answer questions in a statistically improbable way, such as by being self-contradictory, and puts more weight on questions that exhibit greater variance (and thus contain more differentiating information).

Teachers and students fill out the 5E Survey in the winter/spring of each school year (for instance, the 2024 survey window was from January-30 to March-29). Each Measure in each year is standardized and scaled from 1-99. The standardization is always with respect to the school distribution in Illinois in 2013. A value of 50 is meant to indicate the 2013 average. A 20-point move is equivalent to one standard deviation in the 2013 distribution. The benchmarking to the 2013 distribution in all years facilitates straightforward comparisons of changes to the survey Measures over time in terms of both sign and magnitude. For instance, an increase from 2019 to

2021 of 10 points for a particular Measure will mean the same thing (distributionally) as an increase of 10 points from 2021 to 2023.

Noting this advantage of the 2013 benchmarking for facilitating our analysis of changes over time, an interpretive challenge is that while the 5E Survey was administered in 2013, the administration was not universal (like in all pre-2019 years). This creates some ambiguity with respect to what it means to move in the observed 2013 distribution. Put differently, we cannot be sure that a 10-point change translates to a 0.50 standard deviation move in the full 2013 distribution of schools because the full distribution is unobserved. In Appendix A (and Appendix Table A2) we explore this issue in more detail using earlier survey data. We conclude the suggested translation of test points to standard-deviation units is likely accurate, at least to a close approximation, and we use it when we interpret our results below.

Table 3 lists the 20 teacher-directed Measures on the 5E Survey.[7] The Measures capture aspects of working conditions that prior research shows teachers value most. For example, "instructional leadership," "program coherence," and "teacher-principal trust" capture aspects of effective leadership; and "collaborative practices," "quality professional development," "socialization of new teachers," and "teacher-teacher trust" capture aspects of a collaborative environment. The Measures also include aspects of working conditions that have received less attention in prior research but the importance of which is self-evident—e.g., "teacher safety" and "level of classroom disruptions."

The table reports teacher-weighted means and standard deviations of each Measure using data from 2019, which is the last survey year prior to the onset of the COVID pandemic. Higher values always indicate more favorable learning conditions (e.g., the "level of classroom disruptions" Measure is reverse-coded). Column (1) shows most Measures have a mean around 50, though several are notably higher (e.g., level of classroom disruptions, socialization of new

[7] There are 21 unique teacher-directed survey items in total across all years of the survey. However, one measure—on collective use of assessment data—is not available after 2019 and therefore no pandemic or post-pandemic trends can be constructed.

teachers) and several notably lower (e.g., teacher influence, innovation). The standard deviations are also generally close to 20. Columns (2) and (3) divide schools into above- and below-median groups based on IPR(130), which is our measure of the fraction of students living at or below 130 percent of the poverty line. Comparing across these columns shows the familiar pattern from prior research that teacher working conditions are better at high-SES schools (Johnson, Kraft, and Papay, 2012; Kraft, Simon, and Lyon, 2021; Loeb, Darling-Hammond, and Luczak, 2005). This is true on average as indicated by the bottom row of the table, as well as for 17 of the 20 Measures individually (the exceptions are for program coherence, quality professional development, and reflective dialogue, all of which are rated similarly by teachers in high- and low-SES schools).

3.4 Methods

We track trends over time in teacher working conditions from 2017-2023, along with various subsets of years. The 2019-2023 period is of particular interest because (a) it spans the COVID and post-COVID periods, and (b) the 5E Survey dataset has very high coverage during these years. We also separately examine 2-year subperiods from 2017-2019 (pre-COVID), 2019-2021 (during COVID) and 2021-2023 (post-COVID). In addition, we examine trend heterogeneity along several dimensions. At the school level, we divide schools at the median based on IPR(130) and the share of Black enrollment. At the district level, we divide schools based on whether their districts have above- or below-median local-area median household incomes and the predominant mode of instruction: in-person, hybrid, or online.

We report changes in working conditions using teacher-weighted averages of the school-level survey Measures throughout our analysis. Thus, our results should be interpreted as showing the changes in working conditions experienced by the average Illinois teacher (who filled out the survey). In the appendix, we show our substantive findings are unchanged if we do not use the teacher weights, the primary consequence of which is that teachers in small schools are effectively given more weight in the data (see Appendix Table B1).

Finally, and focusing on the pandemic and post-pandemic periods from 2019 to 2023, we estimate a simple multivariate regression to disentangle the relationships among correlated school attributes. The multivariate regression is teacher-weighted and written as follows:

$$\Delta Y_{ij} = \beta_0 + X_{1i}\beta_1 + X_{2i}\beta_2 + X_{3j}\beta_3 + \boldsymbol{X}_{4j}\boldsymbol{\beta}_4 + \varepsilon_{ij} \quad (1)$$

In equation (1), ΔY_{ij} is the average change over the 20 Measures of teacher working conditions from 2019-2023 at school i in district j (i.e., the 2023 value minus the 2019 value), X_{1i} is IPR(130), X_{2i} is the school share of Black students, X_{3j} is median household income in the district catchment area, and $\boldsymbol{X_{4j}}$ is a two-entry vector with the instructional shares for virtual and hybrid learning during the 2020-21 school year (the in-person instruction share is the omitted category). ε_{ij} is an idiosyncratic error, which we cluster at the district level.

4. Results

Table 4 shows changes in teacher working conditions over different timespans covered by our data panel. Column (1) shows that from 2017-2023 working conditions generally declined, with 13 of the 20 Measures showing negative changes. The bottom row of the table shows the average change over all Measures was -2.9 points, or a reduction of about 15 percent of a benchmarked standard deviation. The subsequent columns indicate the decline in working conditions over the full period is driven by declines during and after the pandemic. This is easiest to see in column (3), which shows that in the 2 years leading into the pandemic from 2017-2019, teacher working conditions did not worsen and in fact improved (by 4.0 points on average over the Measures).

Column (4) of the table shows working conditions declined during the pandemic, but only modestly, by 1.4 points on average over the 20 Measures. Moreover, for many individual Measures (11 of 20) there was no decline at all. Combining the trends from 2017-2019 and 2019-2021, the results are consistent with Redding and Nguyen (2024), who show no evidence of a decline in teacher working conditions between 2016 and 2021 using a limited set of indicators available in the Schools and Staffing Survey. However, the breadth of information on the 5E

Survey and the regularity of its administration allow us to paint a more comprehensive picture of how working conditions changed. For instance, several Measures on the 5E Survey indicate large declines during the pandemic, such as Measures of collaborative practices, student responsibility, and reflective dialogue. Declines in these areas are not surprising given the nature of the COVID disruption to schools. Most of the positive changes to working conditions during the pandemic were substantively small (only three Measures changed positively by more than 2.0 points between 2019 and 2021), with the key exception of teacher safety, which is the Measure with the largest increase during the pandemic period. Teachers' improved sense of safety likely reflects the fact that many teachers were spending more time at home during the 2020-21 school year.

The last column of Table 4 shows the decline in teacher working conditions was more pronounced in the post-pandemic period from 2021 to 2023, during which the average decline over the 20 Measures was 4.5 points, or more than 20 percent of a benchmarked standard deviation. The largest declines during this period were along the dimensions of collective responsibility, innovation, and teacher safety. The post-pandemic decline in teacher safety offset the gain in safety during the pandemic, and more.

Teachers report intuitive improvements in working conditions along some dimensions during the post-pandemic period—e.g., Measures of collaborative practices and reflective dialogue both partially rebound from their low 2021 values by 2023. But some post-pandemic changes are unintuitive, such as continued declines from 2021 in the quality of student discussions and quality of professional development. Teachers also report trust between themselves and principals, parents, and other teachers declined in the post-pandemic period. Our findings in Table 4 are not consistent with the idea that teacher working conditions hit rock bottom during the COVID pandemic.

The Measure of classroom disruptions is also interesting. There are empty cells for this Measure in Table 4 because no value is available in 2021. However, from the three data points we can observe (in 2017, 2019, and 2023), we draw the following conclusions. First, the level of classroom disruptions experienced by teachers was trending in a favorable direction prior to the

pandemic. Second, during the pandemic and post-pandemic periods, classroom disruptions became substantially worse, with this Measure declining by more than one benchmarked standard deviation between 2019 to 2023 (-25.3 points). We cannot identify separate trends during the pandemic and post-pandemic periods, but over the full period spanning 2019 to 2023, this is the Measure with the largest decline by a wide margin.

Figure 1 visualizes the trends in Table 4. For each Measure, we recenter the 2019 value on zero, then report the trend from 2017-2023. The trend in working conditions averaged over all Measures is shown in bold, overlaid on the trends for the individual Measures in grey. In years when the value of a Measure is missing because it was not included on the survey, we interpolate linearly over observed years (e.g., if we observe a value in 2021 and 2023, but not 2022, we interpolate the 2022 value on the straight line connecting 2021 and 2023). Although there are too many Measures to distinguish each one in the picture (for this, use Table 4), it is nonetheless useful to visualize the general trends in working conditions over time.

Next, in Table 5 we document trends in working conditions in high- and low-SES schools. For succinctness we focus on the trends from 2019-2023, which our analysis thus far identifies as the key period over which working conditions declined broadly. In columns (1)-(4) we divide schools at the median based on IPR(130) and the share of Black students in 2019. In columns (5)-(6) we divide schools at the median based on the median household income in their districts using the EDGE data.

Recall from above (Table 3) that high-SES schools have more favorable teacher working conditions in levels. However, the trends since 2019 in Table 5 are similar for both groups. This is most readily apparent by looking at the average changes in the bottom row of the table. The similarity of results is also fairly consistent on a Measure-by-Measure basis, though there are some individual differences. In results suppressed for brevity we explored this result in more detail by dividing schools and districts into terciles rather than at the median, then comparing the top and bottom terciles in each category to create larger SES gaps. We obtain similar results, and

thus conclude there have not been large differences in the trends in teacher working conditions at high- and low-SES schools from 2019 to 2023.

In Table 6 we compare trends from 2019-2023 in districts that differed by the primary mode of instruction during the 2020-21 school year. Here we see a more consistent pattern. Schools in districts that were primarily in-person during the 2020-21 school year had the smallest declines in working conditions, followed by schools in primarily hybrid districts, followed by schools in districts that were primarily online. The gap between the in-person and online groups is quite large—on average across Measures, the latter group's working conditions declined by 3.5 additional points (-8.3 versus -4.8)—more than 15 percent of a standard deviation—from 2019-2023.

Table 7 presents regression results that complement the comparisons in Tables 5 and 6. In Columns (1) to (4) we regress the average change in teacher working conditions on each SES and instructional-mode variable (or set of variables) separately. In column (5) we estimate the multivariate regression shown in equation (1). The results from the multivariate regression by SES are mixed, like in Table 5—e.g., having more students in poverty is conditionally associated with a greater reduction in teacher working conditions, but so is a higher median household income. In terms of mode of instruction, the differences displayed in Table 6 hold up conditional on the SES controls—schools in districts with more online instruction had much larger declines in teacher working conditions from 2019-2023.

We also estimate models analogous to what we show in Table 7, but after modifying the outcome variable to capture the change in teacher working conditions in the post-COVID period only, from 2021 to 2023. We report the results in Appendix Table B2. The findings are generally similar, though (a) there is more consistent evidence of an SES gap favoring advantaged schools in the post-COVID trends and (b) the differences between online learning and other modes of instruction are smaller, albeit of the same sign.

Finally, while our focus is on the teacher-directed questions on the 5E Survey, in Appendix Table B3 we document analogous trends in the student-directed survey items. The

student surveys indicate smaller declines in school conditions overall, and more Measure-by-Measure variability. An interesting parallel to the teacher responses is that like teachers, students identify the largest declines in school conditions as having occurred from 2021 to 2023. In fact, students did not indicate declines in school conditions on average from 2017 to 2021 at all—the declines they report are entirely concentrated in the post-pandemic period from 2021 to 2023.

5. Summary and Conclusion

To the best of our knowledge, we provide the first in-depth empirical analysis of changes to teacher working conditions during and after the COVID pandemic. We use rich survey data from Illinois to show working conditions were improving leading into the pandemic (from 2017 to 2019), declined with the onset of the pandemic (from 2019 to 2021), and then declined at a faster rate after the pandemic (from 2021 to 2023). Our findings raise concerns about the state of the teaching profession, complementing recent work by Kraft and Lyon (2024) showing that professional prestige and satisfaction among teachers nationally have been declining broadly for over a decade. Our work suggests worsening contemporary teacher working conditions may exacerbate problems in the profession going forward.

Teachers report declines in working conditions during the pandemic and post-pandemic periods—from 2019 to 2023—across virtually every available measure in our data (18 of 20 individual Measures on the 5E Survey). Some of the largest total declines are in the areas of classroom disruptions, student responsibility, quality of student discussion, expectations for postsecondary education, and innovation. Over the pandemic and post-pandemic periods the patterns of change are heterogeneous in intuitive and unintuitive ways. An example of an intuitive pattern is that during the pandemic, working conditions related to collaboration and reflective dialogue unsurprisingly declined, and these conditions partially rebounded in the post-pandemic period. But it is unintuitive that teachers report the quality of student discussions continued to deteriorate from 2021 to 2023, as did the quality of professional development. Given the challenges schools were facing in 2021, one might have imagined it would be a low point for these types of working-condition indicators, but this is not what teachers perceived.

Additional concerning findings in our post-pandemic analysis are across-the-board declines in the levels of teacher-parent, teacher-principal, and teacher-teacher trust, and a substantial reduction in teachers' perceptions of their own safety. The latter result is likely partly a reversal of teachers' improved sense of safety when they were working at home more often during the pandemic; however, this explanation cannot account for the full post-pandemic decline in teacher safety from 2021 to 2023.

The obvious question prompted by our findings is the following: How can we improve teacher working conditions? We are tempted to speculate but will refrain—this is not our domain of expertise and others are better-suited to answer this question. That said, we hope experts will approach this question with humility and recognize the uncertainty created by the profound changes in schools since the onset of the pandemic. As noted in the introduction, these include changes related to the pandemic directly (e.g., changes to academic standards, and student attendance and participation in schools) and unrelated changes (e.g., such as those brought on by general societal unrest). All of these factors raise concerns about the generalizability of our pre-COVID understanding of teacher working conditions to the modern, post-COVID context. It would be of great value to collect feedback from teachers directly about what supports they believe would help them to overcome the challenges they identify on the 5E Survey.

Finally, we conclude by noting the strengths and limitations of our study. The primary strengths are the depth of information on teacher working conditions on the 5E Survey, its wide coverage of schools, and the high teacher response rate. The depth of information on the survey gives us confidence that the trends we identify reflect teachers' true perceptions of their working conditions accurately—i.e., we are not depending on a small number of survey items to draw broad conclusions about working conditions. The high coverage of the survey, and high teacher response rate, limit concerns about biased inference due to selection into survey participation.

We also note two limitations, once conceptual and one technical. The conceptual limitation is that we do not attempt to attribute the changes in teacher working conditions to specific causal factors. While in the abstract this is a desirable goal, we are skeptical of its

feasibility because multiple major events affected schools across the nation around the onset of the pandemic, and disentangling their impacts will be difficult. Although we do not isolate the specific causal mechanism(s) driving our findings, we believe our descriptive results can be useful for researchers and policymakers nonetheless. The technical limitation of our study is that we use data from just one state. While we are unable to provide any direct evidence on generalizability to other states, we see no obvious reason to expect teacher experiences in Illinois to be unique over the period we study. That said, future work on teacher working conditions in other states can provide concrete evidence on this point and would be a valuable addition to the literature.

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Table 1. 5E Survey sample size and coverage by year.

	Schools & Students					Teachers		
Year	5E Schools	5E Schools as a fraction of all schools listed in the CCD	Number of students in 5E schools	Students in 5E schools as a fraction of total Illinois enrollment in the CCD		Number of teachers in 5E schools	Teacher survey response rate (Conditional on School Sampling)	Estimated number of teacher respondents (number*rate)
2023	3,524	0.80	1,725,630	0.93		167,527	77.13	129,219
2022	3,393	0.77	1,690,481	0.90		164,118	75.29	123,568
2021	3,436	0.78	1,707,862	0.90		164,095	76.22	125,078
2019	3,511	0.80	1,807,721	0.91		159,232	81.68	130,068
2018	2,029	0.47	1,096,685	0.55		84,013	86.77	72,896
2017	2,175	0.52	1,105,975	0.55		80,140	85.25	68,323

Notes: CCD=Common Core of Data. The teacher survey response rate is calculated as the weighted average of schools' response rates where the number of teachers in the school is the weight. The estimated number of teachers surveyed is calculated by multiplying the number of teachers by the teacher survey response rate. Enrollment in some schools in the CCD is missing. If missing, we impute school enrollment using a contiguous year value in the CCD. If there is no contiguous year value, enrollment is imputed as the number of eligible student respondents to the 5E survey, with an adjustment for primary schools given that the survey is not administered prior to the 4^{th} grade. Schools that participated in the 5E Survey, but for which the data are censored due to small samples, are not included in the analysis that follows, and as such they are treated as being excluded from the 5E dataset in this table.

Table 2. Summary statistics.

	Illinois Average	National Average
Student Characteristics (2018-19 School Year)		
Percent Asian	5.0	5.3
Percent Black	16.7	15.1
Percent Hispanic	26.7	27.2
Percent White	47.2	47.0
Percent Other	4.1	5.5
School Characteristics (2018-19 School Year)		
Percent of Enrollment in Charter Schools	3.2	6.5
Percent of Students ≤ 130 Percent of Poverty Line	31.1	32.0
District Characteristics (2018-19 School Year)		
Median Household Income	$54,500	$65,700
Percent of Parents with Bachelor's Degree or Higher	39.8	42.6
District Modes of Instruction (2020-21 School Year)		
Percent Time in In-Person Learning	23.8	38.5
Percent Time in Hybrid Learning	41.2	33.8
Percent time in Online Learning	35.1	27.7
N (Public K-12 Students)	1,891,730	50,694,061

Notes: The data for this table are taken from the Common Core of Data, the National Center for Education Statistics' Education Demographic and Geographic Estimates (EDGE) program, Fazlul, Koedel, and Parsons (2023), and the COVID-19 School Data Hub. The data are from the 2018-19 school year, except for mode of instruction, which is from the 2020-21 school year. The fraction of students living at or below 130 percent of the poverty line is estimated based on School Neighborhood Poverty data from the National Center for Education Statistics, following Fazlul, Koedel, and Parsons (2023). School- and district-level summary statistics are weighted by student enrollment.

Table 3. Means and standard deviations of the focal survey Measures of teacher working conditions, 2019.

	All Schools	High-SES Schools: Below-median IPR(130)	Low-SES Schools: Above-median IPR(130)
	Mean (St Dev)	Mean (St Dev)	Mean (St Dev)
Level of Classroom Disruptions	75 (20)	80* (17)	68* (22)
Collaborative Practices	49 (24)	50 (23)	48 (24)
Collective Responsibility	47 (20)	48* (19)	45* (21)
Teacher Influence	39 (13)	41* (12)	38* (13)
Innovation	41 (23)	42 (22)	40 (24)
Instructional Leadership	46 (21)	47 (21)	46 (21)
Program Coherence	54 (20)	54 (19)	54 (20)
Parent Influence on Decision Making in Schools	52 (21)	54* (20)	50* (21)
Parent Involvement in School	51 (21)	57* (19)	45* (21)
Student Responsibility	55 (21)	60* (19)	48* (22)
Quality Professional Development	55 (22)	55 (22)	56 (23)
Reflective Dialogue	50 (22)	50 (21)	50 (23)
School Commitment	48 (20)	51* (19)	45* (20)
Quality of Student Discussion	53 (24)	57* (22)	49* (25)
Socialization of New Teachers	83 (22)	85* (21)	80* (23)
Teacher-Parent Trust	56 (24)	63* (22)	48* (24)
Teacher-Principal Trust	49 (18)	50 (18)	48 (19)
Teacher-Teacher Trust	53 (19)	55* (18)	51* (20)
Teacher Safety	43 (20)	47* (18)	38* (20)
Expectations for Postsecondary Education	54 (20)	59* (19)	49* (20)
Simple Average	52.7	55.3	49.8

Notes: All values are teacher-weighted averages of the school-level survey Measures. High and low-SES schools are defined, respectively, as below- and above-median schools as measured by the share of students living at or below 130 percent of the poverty line.

* indicates the difference between high- and low-SES schools is statistically significant at the 5 percent level. We do not report on statistical significance for the averages in the bottom row of the table.

Table 4. Changes in teacher working conditions from over various time periods.

	Full Panel	During & After the Pandemic		2-Year Windows		
	2017-2023	2019-2023		2017-2019	2019-2021	2021-2023
Level of Classroom Disruptions	-11.4*	-25.3*		13.9*		
Collaborative Practices	0.5	-5.1*		5.6*	-10.7*	5.6*
Collective Responsibility	-6.8*	-9.5*		2.7*	1.0*	-10.5*
Teacher Influence	-0.4	-2.5*		2.1*	1.4*	-3.9*
Innovation	-10.0*	-10.4*		0.4	1.9*	-12.3*
Instructional Leadership	-0.3	-4.2*		3.9*	0	-4.2*
Program Coherence	2.2*	-3.6*		5.8*	2.9*	-6.6*
Parent Influence on Decision Making in Schools	3.2*	2.4*		0.8	5.6*	-3.2*
Parent Involvement in School	3.6*	-3.5*		7.1*	-2.5*	-1.1*
Student Responsibility	-10.3*	-10.3*		0	-12.0*	1.7*
Quality Professional Development	0.4	-6.1*		6.4*	-4.3*	-1.7*
Reflective Dialogue	-4.6*	-8.2*		3.6*	-17.8*	9.6*
School Commitment	-7.2*	-9.5*		2.2*	-0.2	-9.3*
Quality of Student Discussion	-10.2*	-12.6*		2.4*	-5.7*	-6.9*
Socialization of New Teachers	2.7*	1.4*		1.3	1.3*	0.1
Teacher-Parent Trust	-1.7	-6.9*		5.3*	0.6	-7.6*
Teacher-Principal Trust	-2.5*	-3.5*		1.0	0.8	-4.3*
Teacher-Teacher Trust	0.9	-4.5*		5.4*	0.4	-4.9*
Teacher Safety	-3.3*	-6.3*		3.0*	13.5*	-19.8*
Expectations for Postsecondary Education	-3.8*	-10.2*		6.5*	-3.6*	-6.6*
Simple Average	-2.9	-6.9		4.0	-1.4	-4.5

Notes: All values are teacher-weighted averages of the school-level survey Measures. Measures are coded by the survey administrators so that more positive values always indicate better working conditions. Empty cells indicate that for the Measure indicated by the row, separate values are not available in both years indicated by the column.

* indicates the change in the Measure over the given time period is statistically significant at the 5 percent level. We do not report on statistical significance for the averages in the bottom row of the table.

Table 5. Changes in teacher working conditions for schools and districts that differ by socioeconomic conditions, 2019 to 2023.

	School Neighborhood Poverty IPR(130)		School Share Black		District Median Household Income	
	High SES	Low SES	High SES	Low SES	High SES	Low SES
	2019-2023	2019-2023	2019-2023	2019-2023	2019-2023	2019-2023
Level of Classroom Disruptions	-26.9*	-23.6*	-26.9*	-24.1*	-27.2*	-23.3*
Collaborative Practices	-4.2	-6.3	-4.1	-5.9	-4.1*	-6.7*
Collective Responsibility	-9.5	-9.4	-9.0	-9.7	-9.6	-9.4
Teacher Influence	-2.7	-2.2	-2.4	-2.5	-3.0	-2.0
Innovation	-10.2	-10.5	-10.0	-10.6	-10.4	-10.4
Instructional Leadership	-4.0	-4.1	-2.9*	-5.0*	-4.2	-4.2
Program Coherence	-3.6	-3.2	-3	-3.7	-4.3	-2.5
Parent Influence on Decision Making in Schools	3.3*	1.1*	3.7*	1.2*	3.7*	0.3*
Parent Involvement in School	-3.4	-3.9	-3.2	-4.0	-3.3	-4.3
Student Responsibility	-10.5	-10.0	-9.9	-10.5	-10.4	-10.3
Quality Professional Development	-5.3	-6.5	-4.6*	-6.8*	-5.6	-6.5
Reflective Dialogue	-8.0	-8.3	-7.0*	-9.1*	-7.9	-8.7
School Commitment	-10.4*	-8.2*	-9.8	-9.1	-11.0*	-7.6*
Quality of Student Discussion	-13.5*	-11.2*	-12.6	-12.3	-13.9*	-10.9*
Socialization of New Teachers	1.6	0.6	1.8	0.7	1.0	1.0
Teacher-Parent Trust	-8.1*	-5.9*	-7.8	-6.4	-8.5*	-5.5*
Teacher-Principal Trust	-3.3	-3.7	-2.4*	-4.3*	-3.7	-3.5
Teacher-Teacher Trust	-4.1	-5.0	-3.9	-4.9	-4.1	-5.1
Teacher Safety	-8.1*	-4.3*	-8.0*	-4.9*	-9.1*	-3.2*
Expectations for Postsecondary Education	-10.6	-10.2	-10.8	-9.9	-10.7	-10.0
Simple Average	-7.1	-6.7	-6.6	-7.1	-7.3	-6.6

Notes: All values are teacher-weighted averages of the school-level survey Measures. Schools are divided into high- and low-SES groups at the median value of each indicator of socioeconomic status. IPR(130) and the share of Black students are school-level variables and median household income is a district variable. For the latter, we merged in district-level data and calculated the median value across schools to categorize them as above- or below-median.

* indicates the change at high-SES schools is statistically different from the change at low-SES schools at the 5 percent level. We do not report on statistical significance for the averages in the bottom row of the table.

Table 6. Changes in teacher working conditions by districts' primary mode of instruction during the 2020-21 school year, 2019 to 2023.

	In-person	Hybrid	Online
	2019-2023	2019-2023	2019-2023
Level of Classroom Disruptions	-24.0	-25.7	-25.6
Collaborative Practices	-1.7	-3.5	-8.7*
Collective Responsibility	-8.6	-8.8	-10.6
Teacher Influence	-1.0	-2.7*	-3.0*
Innovation	-9.0	-9.9	-11.6
Instructional Leadership	-2.3	-3.8	-5.6*
Program Coherence	-3.7	-4.0	-3.3
Parent Influence on Decision Making in Schools	7.0	4.0*	-1.7*
Parent Involvement in School	-0.4	-2.7	-5.9*
Student Responsibility	-7.5	-9.5	-12.3*
Quality Professional Development	-2.4	-5.5*	-8.6*
Reflective Dialogue	-5.6	-7.7	-10.3*
School Commitment	-8.8	-10.2	-9.0
Quality of Student Discussion	-8.8	-12.6*	-14.6*
Socialization of New Teachers	4.5	1.0*	0.1*
Teacher-Parent Trust	-4.9	-7.5	-7.4
Teacher-Principal Trust	-2.5	-3.2	-4.2
Teacher-Teacher Trust	-3.4	-3.6	-5.8*
Teacher Safety	-5.9	-7.3	-5.4
Expectations for Postsecondary Education	-7.4	-10.1	-11.7
Simple Average	-4.8	-6.7	-8.3

Notes: All values are teacher-weighted averages of the school-level survey Measures. Schools are divided into groups based on the primary mode of instruction in their districts during the 2020-21 school year.

* indicates the change for hybrid or online learning (columns 2 and 3) is statistically different from the change for in-person learning (column 1) at the 5 percent level. We do not report on statistical significance for the averages in the bottom row of the table.

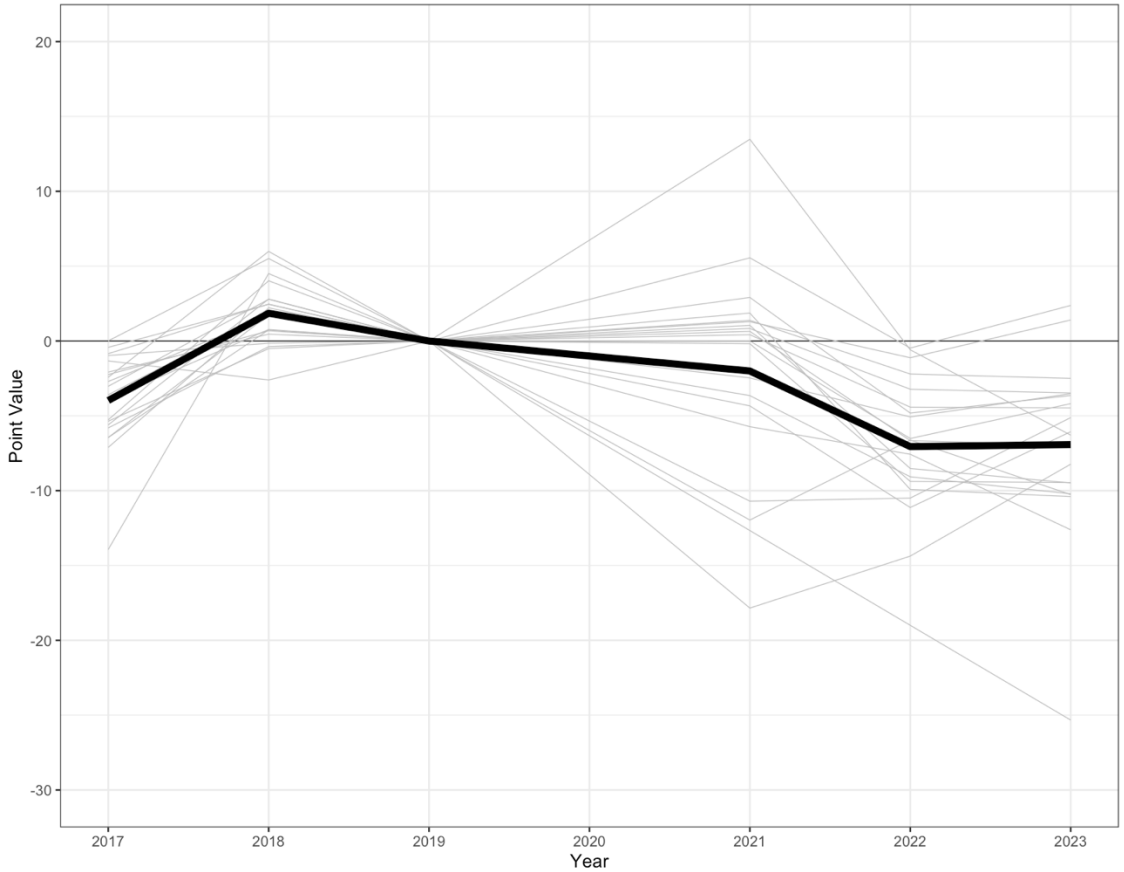
Table 7. Results from regressions of the change in teacher working conditions from 2019 to 2023, averaged over the 20 5E Survey Measures, on school and district characteristics.

	1	2	3	4	5
IPR(130)	-0.36 (4.17)				-4.81* (2.35)
Share of black students		-1.79 (1.50)			-0.08 (1.00)
Median Household Income (in $1,000s)			-0.04 (0.02)		-0.08* (0.02)
Share of 2020-21 AY spent online				-5.55* (1.94)	-6.47* (1.92)
Share of 2020-21 AY spent hybrid				-1.42 (1.09)	-1.43 (1.06)
N	3251	3246	3149	3251	3144
R^2	<0.001	0.002	0.006	0.016	0.029

Notes: Regressions are teacher-weighted and the standard errors are clustered by district. Data for IPR(130) and the share of Black students are from 2019. District median household income from the EDGE data and based on the American Community Survey over the years 2017 to 2021. Mode-of-instruction data are based on data from the 2020-21 school year. The small differences in the sample size going across the rows of the table reflect data availability for the independent variables.

* indicates coefficient is statistically significant at the 5 percent level.

Figure 1. Visualization of trends in teacher working conditions from 2017 to 2023; 2019 is standardized to zero for each Measure.



Notes: When a value is missing in a year for a Measure, we linearly interpolate using available data. This includes 2020, when the 5E survey was not administered for any Measure and thus all values are missing. This visualization is useful for showing the larger picture but is not designed to be informative about individual Measures. For information about trends in individual Measures, see Table 4.

Appendices
(Online Only)

Appendix A
Data Adjustments and Exploration

A.1 Representativeness of 5E Survey Data from 2017 and 2018

Prior to 2019, the 5E Survey dataset includes only partial samples of Illinois schools in each year. Table 1 in the main text provides high-level information about the partial samples. We expand our investigation of the partial samples here with a focus on the degree to which they are representative of all Illinois schools.

Column (1) of Appendix Table A1 reports teacher weighted averages of schools' shares of students living at or below 130 percent of the poverty line in the 5E Survey dataset, as estimated by IPR(130). Column (2) shows these same shares in all Illinois schools as reported in federal data from NCES and weighted by student enrollment (we weight by student enrollment because the federal data do not include teacher counts by school, but student enrollment and teacher counts will be highly correlated at the school level). The first four rows of the table show that between 2019 and 2023, the 5E Survey dataset is a very close match to the full sample of Illinois schools. This is as expected given the near-universal coverage of the 5E Survey dataset in those years, per Table 1 in the main text.

The partial samples in 2017 and 2018 are similar to the full sample of Illinois schools, but they are a worse match. For instance, in 2018, column (2) shows that 30.6 percent of Illinois students were living at or below 130 percent of the poverty line, but in the 2018 5E Survey sample, 32.5 percent were living at or below 130 percent of the poverty line. A discrepancy in the opposite direction exists in 2017.[8] Columns (4) and (5) show the same comparisons for the shares of Black students in the 5E Survey dataset and full Illinois sample. The patterns mirror what we show for IPR(130).

[8] An explanation for why the discrepancies are in opposite directions in 2017 and 2018 is that prior to the (near) universal use of the 5E Survey, the law required Illinois schools to survey about school conditions every other year. Schools that are in the 2017 5E Survey dataset are mostly absent in the 2018 Survey dataset, and vice versa.

We use a simple reweighting procedure to improve the representativeness of the 5E Survey data from 2017 and 2018. Specifically, we re-weight the data in both years in order to better match the distributions of IPR(130) and the Black share during the first year of near universal survey coverage in 2019. We illustrate our approach with the 2018 data. First, we begin with the full sample of 2019 schools in the 5E Survey dataset and identify all schools that are not in the 2018 dataset. Next, we predict whether school *i* from the 2019 dataset is missing in the 2018 dataset using data on IPR(130) and the share of Black students as follows:

$$M_i = \alpha_0 + B_i\alpha_1 + \boldsymbol{IPR}_{\mathbf{i}}^{\mathbf{D}}\boldsymbol{\alpha}_2 + \left(\boldsymbol{IPR}_{\mathbf{i}}^{\mathbf{D}} \cdot B_i\right)\boldsymbol{\alpha}_3 + \nu_i \quad \text{(A1)}$$

In equation (A1), M_i is a binary indicator variable equal to one if school *i* is missing in the 2018 dataset, $\boldsymbol{IPR}_{\mathbf{i}}^{\mathbf{D}}$ is a vector of indicator variables for deciles of IPR(130) for school *i*, B_i is the scalar value of the Black Share, and ν_i is the error. Note that we use a vector of decile indicators for IPR(130) to improve model fit. We estimate equation (A1) as a logit, and store the predictive logit coefficient estimates $\widehat{\alpha}_0$, $\widehat{\alpha}_1$, $\widehat{\boldsymbol{\alpha}}_2$, and $\widehat{\boldsymbol{\alpha}}_3$.

We then apply these coefficients to the profiles of schools in the 2018 dataset and run them through the logit function to produce "adjustment weights" that, when applied to the 2018 sample, make the sample look closer to the 2019 sample. Intuitively, this works because the weights are higher for schools with characteristics that are underrepresented in the 2018 dataset (since we predict which schools are missing in 2018 in equation (A1)). Finally, we repeat this entire procedure independently for the 2017 Survey dataset, also relative to 2019.

The efficacy of the reweighting procedure is shown in columns (3) and (6) of Appendix Table A1. For both variables and in both 2017 and 2018, the reweighting procedure reduces the socioeconomic differences between the 5E Survey dataset and all Illinois schools. In all but one case—the Black share in 2018—the improvement leads to a close match. We use the reweighted data based on this procedure for 2017 and 2018 throughout the main text.

We conclude by elaborating on why the reweighting procedure does not lead to an even better alignment between the CCD data and reweighted 5E Survey data within years. There are

three reasons, two minor reasons and one that is more significant. The two minor reasons are: (1) the adjustment is designed to make the 2017 and 2018 5E Survey data more representative of the 2019 5E Survey data, and the 2019 5E Survey data are not identical to either the 2017 or 2018 full-sample data, and (2) the reweighting parameters are estimated on 2019 data and then applied to either 2017 or 2018 data, which causes some discrepancies due to the out-of-sample application.[9]

The more significant reason explains the poor match on the 2018 Black share. Upon further investigation, this is caused by a problem with the 2018 Black share data in the CCD. Specifically, there is an unexplained spike in the fraction of Illinois schools with 95-100 percent Black enrollment in 2018, which is not present in 2017 or 2019. When we apply the 2019 parameters to the 2018 data to construct the weights, the fact that the 2018 and 2019 distributions of the Black share are so different reduces the efficacy of the new weights. We could have developed an *ad hoc* correction to address this problem with the underlying CCD data, but for the purpose of transparency, and because the 2018 data are not focal to our analysis, we have elected to simply note this dimension of noncomparability after reweighting as a caveat.

A.2 Influence of the Partial Benchmarking Sample from 2013

The Measures on the 5E Survey in all years are standardized based on the mean and standard deviation of survey responses in 2013. A value of 50 is meant to indicate the 2013 average and a 20-point move corresponds to one standard deviation of the 2013 distribution. This standardization is especially useful for tracking trends over time, as moves in "points" have the same meaning (distributionally) in all years. It is also useful for interpreting the magnitudes of changes in teacher working conditions indicated by the survey results.

An issue with the latter, however, is that not all Illinois schools administered the 5E Survey prior to 2019. Importantly, this does not affect the main benefit of the standardization,

[9] In principle we could resolve these issues by adjusting our procedure to estimate Equation (A1) on the full sample of CCD schools in each year, not schools in the 2019 5E Survey dataset. We elected to do the latter to make the transition from the partial-sample years in 2017 and 2018, to the first full-sample year in 2019, as smooth as possible in the 5E dataset. Since the predictive accuracy is quite good, we did not pursue further adjustments.

which is that it allows us to track trends in survey responses over time in consistent units. But it does cloud inference about the absolute magnitudes of the changes. To illustrate the problem, suppose the subsample of schools that participated in the 5E Survey in 2013 was more homogeneous than the population of Illinois schools. For instance, for a given Measure in 2013, the standard deviation among sampled schools might have been 20, but among all schools, the (unobserved) standard deviation could have been 30. If this was the case, then a 20 point move in some future year—say 2019—would not correspond to a full standard deviation of the 2013 Illinois school distribution, but just two-thirds of a standard deviation.

Given the full 2013 distribution is unobserved, we cannot recover it with certainty. A next-best solution is to take data from a full-coverage year—again, say 2019—and compare the standard deviations of the Measures in that year (i.e., in 2019) in the full sample and the subsample of schools also present in the 2013 data. If the standard deviations in the 2019 data are similar across the full and partial samples, and if we assume the degree of homogeneity of the 2013 subsample is roughly time invariant, this comparison gives insight into whether the 2013 subsample is more homogeneous than the full sample. If the standard deviations in the 2013 subsample are sufficiently smaller, for instance, it would imply that the magnitudes of our findings—meant to be expressed in standard deviation units of the full Illinois distribution—are overstated by benchmarking to the partial 2013 distribution.

Unfortunately, we cannot implement this approach because the first year for which ISBE provides 5E Survey data is 2014, one year after the benchmarking sample in 2013. As an alternative, we conduct this exercise using data from 2014, 2015, and 2016. Though none of these years is 2013, prior to 2019 schools moved in and out of the sample with some regularity. If the partial coverage of the 2013 5E Survey dataset is compressing the variance of survey responses relative what would be observed in the population of all schools, it is also likely this problem would emerge in the other partial-coverage years. To give some sense of the degree of partial coverage of the 5E Survey and its variability in 2014, 2015 and 2016, the percent of schools in the 2019 5E sample that are also present in these years is 71.0, 90.8, and 37.1,

respectively. There are also considerable shifts in the sample composition across these years—as an example, of the schools in the 2014 5E Survey dataset, just 42.7 percent are in the dataset again in 2016.

Appendix Table A2 uses data from 2019 to compare the standard deviation of each Survey Measure for (a) all Illinois schools in the 5E Survey dataset and (b) schools that were present in the 2014, 2015, and 2016 5E Survey datasets. The table shows the standard deviations in the 2014 and 2015 samples are a very close match to the standard deviations in 2019—for each Measure in these years, the ratio of standard deviations rounds to 1.0. The standard deviations are somewhat smaller in 2016, though the most common ratio value is still 1.0, and the ratio for just one Measure exceeds 1.1. While not conclusive evidence, these findings give little reason to believe the 2013 benchmarking sample was considerably more homogeneous than the full sample of Illinois schools. Thus, we interpret the magnitudes of our findings as suggested by the survey developers—i.e., a 20-point change in a Measure reflects a move of approximately one standard deviation in the 2013 distribution of Illinois schools.

Appendix Table A1. Comparison to federal data of the shares of Illinois students who are Black and living at or below 130 percent of the poverty line in schools sampled by the 5E Survey in each year, with and without data reweighting in 2017 and 2018.

Year	Implied high-poverty share in 5E survey	High-poverty share in all Illinois schools	Reweighted high-poverty share in 5E survey		Implied Black share in 5E survey	Black share in all Illinois schools (CCD)	Reweighted Black share in 5E survey
2023	0.307	0.306	N/A		0.164	0.164	N/A
2022	0.308	0.307	N/A		0.165	0.165	N/A
2021	0.307	0.307	N/A		0.164	0.164	N/A
2019	0.308	0.309	N/A		0.164	0.166	N/A
2018	0.325	0.306	0.295		0.224	0.168	0.121
2017	0.295	0.312	0.322		0.118	0.170	0.172

Notes: High-poverty students are students living at or below 130 percent of the poverty line. We estimate the shares of high-poverty students using NCES school neighborhood poverty data for schools in the Common Core of Data, modified following Fazlul, Koedel, and Parsons (2023). We refer to these estimates as IPR(130) and describe them in the main text. The share of Black students is taken from the Common Core of Data in each year. The "implied" shares in the 5E Survey dataset are based on our calculations after merging the Common Core of Data with the 5E Survey dataset in each year and are teacher weighted averages of schools present in the 5E data. The shares for all Illinois schools are similarly calculated, but for all schools in Illinois in the Common Core of Data and weighted by student enrollment. For the years 2019 to 2023, the 5E Survey Dataset and the Common Core of Data are a very close match because the 5E Survey was nearly universally administered in these years. In 2017 and 2018, the numbers do not match as well; the 5E Survey in those years is a partial sample of schools. The "reweighted" shares follow the procedure we describe in this appendix to reweight the 2017 and 2018 5E Survey data to make the data more representative of all Illinois schools along these dimensions. We use the reweighted data from 2017 and 2018 throughout our analysis in the main text.

Appendix Table A2. Standard Deviations for each Measure in the 2019 data, for full 2019 5E sample and the subsample of schools also present in 2014, 2015, and 2016.

	2019 Full Sample		2014 Subsample		2015 Subsample		2016 Subsample	
	Standard Deviations		Standard Deviations	Ratio	Standard Deviations	Ratio	Standard Deviations	Ratio
Level of Classroom Disruptions	21.9		21.8	1.0	22.1	1.0	23.5	0.9
Collaborative Practices	25.5		25.6	1.0	25.6	1.0	24.0	1.1
Collective Responsibility	21.7		21.5	1.0	21.7	1.0	21.2	1.0
Teacher Influence	11.9		11.8	1.0	11.9	1.0	11.5	1.0
Innovation	24.7		24.6	1.0	24.8	1.0	23.0	1.1
Instructional Leadership	22.2		22.1	1.0	22.2	1.0	21.6	1.0
Program Coherence	20.1		20.0	1.0	20.1	1.0	19.7	1.0
Parent Influence on Decision Making in Schools	21.6		21.5	1.0	21.7	1.0	20.0	1.1
Parent Involvement in School	21.1		20.9	1.0	21.2	1.0	20.9	1.0
Student Responsibility	22.7		22.2	1.0	22.9	1.0	23.8	1.0
Quality Professional Development	23.0		23.3	1.0	23.0	1.0	21.4	1.1
Reflective Dialogue	24.0		24.2	1.0	24.1	1.0	22.2	1.1
School Commitment	20.5		20.3	1.0	20.6	1.0	20.9	1.0
Quality of Student Discussion	24.6		24.6	1.0	24.9	1.0	24.5	1.0
Socialization of New Teachers	23.8		23.2	1.0	23.8	1.0	21.7	1.1
Teacher-Parent Trust	24.5		24.2	1.0	24.6	1.0	24.4	1.0
Teacher-Principal Trust	19.0		19.1	1.0	18.9	1.0	19.5	1.0
Teacher-Teacher Trust	20.8		20.5	1.0	20.9	1.0	19.5	1.1
Teacher Safety	20.1		19.8	1.0	20.2	1.0	21.1	1.0
Expectations for Postsecondary Ed	19.0		19.1	1.0	19.0	1.0	16.2	1.2

Notes: As described in the appendix text, the 2015 subsample is our best estimate of the subsample of schools in 2013, which is the subsample used for benchmarking the Measures in the 5E Survey throughout. Standard-deviation ratios close to 1.0 in the third column of the table suggest the benchmarking is roughly accurate for the full 2013 distribution of Illinois schools.

Appendix B
Supplementary Tables

Appendix Table B1. Replication of Table 4 using unweighted school data.

	Full Panel	During & After the Pandemic		2-Year Windows		
	2017-2023	2019-2023		2017-2019	2019-2021	2021-2023
Level of Classroom Disruptions	-10.9*	-24.7*		13.8*		
Collaborative Practices	1.2	-4.9*		6.0*	-10.5*	5.7*
Collective Responsibility	-6.3*	-9.1*		2.8*	0.8	-9.9*
Teacher Influence	-0.3	-1.8*		1.5*	1.4*	-3.2*
Innovation	-10.2*	-10.2*		-0.1	1.4*	-11.5*
Instructional Leadership	1.4	-2.6*		4.0*	0.2	-2.8*
Program Coherence	3.0*	-2.8*		5.8*	2.9*	-5.7*
Parent Influence on Decision Making in Schools	3.8*	3.4*		0.4	6.0*	-2.6*
Parent Involvement in School	3.5*	-2.8*		6.3*	-2.2*	-0.6
Student Responsibility	-9.6*	-9.7*		0	-10.0*	0.3
Quality Professional Development	1.9*	-4.7*		6.7*	-4.8*	0.1
Reflective Dialogue	-4.5*	-8.0*		3.5*	-17.5*	9.5*
School Commitment	-6.4*	-8.4*		2.0*	0.2	-8.6*
Quality of Student Discussion	-8.5*	-11.2*		2.8*	-2.4*	-8.9*
Socialization of New Teachers	4.1*	2.4*		1.8*	1.5*	0.9
Teacher-Parent Trust	-1.4	-6.0*		4.6*	1.4*	-7.4*
Teacher-Principal Trust	-1.9*	-3.0*		1.1	0.7	-3.7*
Teacher-Teacher Trust	1.4*	-3.9*		5.3*	0.5	-4.4*
Teacher Safety	-2.4*	-5.2*		2.8*	14.2*	-19.4*
Expectations for Postsecondary Education	-3.3*	-9.4*		6.1*	-3.5*	-5.9*
Simple Average	-2.3	-6.1		3.9	-1.0	-4.1

Notes: These results are unweighted. The results in Table 4 are teacher-weighted to reflect the experience of the average teacher in the Survey dataset. These unweighted results reflect the teacher experience in the average school, which implicitly upweights working conditions in small schools relative to Table 4. Measures are coded by the survey administrators so that more positive values always indicate better working conditions. Empty cells indicate that for the Measure indicated by the row, separate values are not available in both years indicated by the column.

* indicates the change in the Measure over the given time period is statistically significant at the 5 percent level. We do not report on statistical significance for the averages in the bottom row of the table.

Table B2. Results from regressions of the change in teacher working conditions from 2021 to 2023, averaged over the 20 5E Survey Measures, on school and district characteristics.

	1	2	3	4	5
IPR(130)	-8.24* (1.27)				-2.51 (2.19)
Share of black students		-5.01* (0.57)			-3.61* (0.93)
Median Household Income (in $1,000s)			0.04* (0.01)		0.01 (0.01)
Share of 2020-21 AY spent online				-4.02* (0.82)	-1.94* (0.84)
Share of 2020-21 AY spent hybrid				-2.02* (0.85)	-1.66 (0.89)
N	3197	3192	3097	3197	3092
R^2	0.009	0.017	0.006	0.012	0.023

Notes: This table replicates the results in Table 7 with one change: the dependent variable is the change in teacher working conditions from 2021 to 2023, not 2019 to 2023. Regressions are teacher-weighted and the standard errors are clustered by district. Data for IPR(130) and the share of Black students are from 2019. District median household income from the EDGE data and based on the American Community Survey over the years 2017 to 2021. Mode-of-instruction data are based on data from the 2020-21 school year. The small differences in the sample size going across the rows of the table reflect data availability for the independent variables.

* indicates coefficient is statistically significant at the 5 percent level.

Appendix Table B3. Trends in the non-focal Measures on the 5E Survey, which are based on student-directed items.

	Full Panel	During & After the Pandemic		2-Year Windows		
	2017-2023	2019-2023		2017-2019	2019-2021	2021-2023
Peer Support for Academic Work	3.7*	-1.9*		5.6*	16.3*	-18.1*
Course Clarity		-6.3*			6.3*	-12.6*
Emotional Health				-1.8		
Academic Engagement	-1.5	0.2		-1.7	4.2*	-4.0*
English Instruction	10.2*	3.2*		7.0*	-2.7*	6.0*
Importance of High School for the Future	-3.4*	-3.8*		0.4	-11.2*	7.4*
Grit				-9.5*		
Human & Social Resources in the Community	4.2*	2.1*		2.1*	6.9*	-4.8*
Math Instruction	-1.3	-3.5*		2.2*	-13.6*	10.1*
Student Peer Relationships	-6.1*	-9.3*		3.2*	24.0*	-33.3*
Academic Personalism	5.4*	-2.7*		8.2*	7.5*	-10.2*
Academic Press	-2.6*	-7.9*		5.3*	-6.5*	-1.4*
Parent Supportiveness		-19.7*			-14.9*	-4.9*
School Connectedness				-0.8		
Classroom Rigor	13.6*	5.9*		7.7*	9.0*	-3.1*
Safety	-7.3*	-9.5*		2.2*	1.7*	-11.2*
Science Instruction	5.8*	1.6*		4.1*	-12.7*	14.3*
School-Wide Future Orientation	0.6	-2.1*		2.7*	1.9*	-4.0*
School Safety				2.6*		
Rigorous Study Habits	1.1	6.1*		-4.9*	17.8*	-11.7*
Student-Teacher Trust	-2.5*	-12.6*		10.1*	7.0*	-19.6*
Simple Average	1.3	-3.5		2.4	2.4	-6.0

Notes: The values in this table are student-weighted because students answered these survey questions. The notes to Table 4 apply. Measures are coded by the survey administrators so that more positive values always indicate better conditions. Empty cells indicate that for the Measure indicated by the row, separate values are not available in both years indicated by the column.

* indicates the change in the Measure over the given time period is statistically significant at the 5 percent level. We do not report on statistical significance for the averages in the bottom row of the table.