Classrooms as Workplaces: How Student Composition Affects Teacher Health*

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Abstract

Work-related burnout and stress-related sickness absence have become increasingly prevalent, but evidence on which workplace features shape workers' mental health remains limited. Using population-level Swedish register data covering all lower- and upper-secondary teachers from 2006–2024, we show that schools serving more disadvantaged students exhibit substantially higher rates of sickness absence, particularly for stress-related diagnoses. Exploiting within-teacher variation across student cohorts, we separate sorting from exposure and find that a one standard deviation increase in student disadvantage raises overall and stress-related sick leave by 3.6 and 8.7 percent, respectively. Survey evidence indicates that these effects operate through classroom conditions rather than workload or organizational differences. The findings establish client composition as a distinct and policy-relevant determinant of worker health in contact-intensive occupations. **JEL:** I10, I21, J63

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1 Introduction

Burnout and stress-related sick leave have become increasingly prevalent, imposing substantial societal costs and personal suffering.[1] In Sweden alone, burnout has been estimated to reduce national labor income by 3.6% (Nekoei, Sigurdsson and Wehr, 2025). Recent work shows that workplaces differ markedly in how they affect workers' mental well-being, even among observationally similar employees (Ahammer, Packham and Smith, 2023). A broad literature links mental-health risks to specific features of the work environment, such as high job demands, limited autonomy, weak managerial or collegial support, organizational dysfunction, and challenging work tasks (Aronsson et al., 2017). Yet, despite this progress, causal evidence on which components of the work environment drive workplace-induced ill mental health remains scarce.

Stress related workplace problems are particularly salient for contact-intensive occupations in healthcare, social work, public safety, and education. These jobs are characterized by close, sustained, and often emotionally demanding interactions with clients or service recipients, and they exhibit high rates of stress and burnout (Agyapong et al., 2022; Beutel et al., 2023).[2] A defining feature of such occupations is that a substantial share of the workload arises from managing interpersonal situations and responding to others' needs, emotions, and behavior in real time. In these settings, workers' well-being may to a greater degree depend on who the clients are than on organizational conditions or managerial practices.

In this paper, we study how the socioeconomic composition of the student body affects teachers' general and mental health. Teachers provide a clear and policy-relevant case of a contact-intensive occupation: they work in complex social environments where daily interactions with students shape both the cognitive and emotional demands of the job. Beyond delivering instruction, teachers manage classroom dynamics, respond to heterogeneous learning needs, and navigate behavioral challenges, often under substantial time pressure. These demands depend not only on school organization and leadership, but also—often most directly—on the characteristics of the students they teach.[3]

To study this relationship, we construct a school-level index of student disadvantage by predicting academic performance from students' socioeconomic characteristics. We link this index to comprehensive Swedish register data on teacher sickness absence from 2006 to 2024, covering the universe of teachers in lower- and upper-secondary schools serving students aged 14–19, and complement the analysis with survey-based measures of teachers' work environment. Our empirical design exploits variation in student composition across cohorts and over time and includes teacher fixed effects, allowing us to separate sorting from exposure to different student populations.[4]

We document that schools serving more disadvantaged students exhibit worse reported work environments and substantially higher rates of teacher sick leave, particularly for stress-related and psychiatric diagnoses. A one standard deviation (1 SD) increase in student disadvantage is associated with a 9% increase in stress-related sickness absence. These gradients remain when

[1] Gallup (2025) reports that in 2025 a non-trivial fractions of employees globally experienced work-related stress (40%), sadness (23%), and anger (21%).

[2] In Sweden, Nekoei, Sigurdsson and Wehr (2025) reports health, education, and non-financial services as top 3 industries in terms of burnout rates.

[3] Student socioeconomic composition plausibly affects teachers' stress and health because it is closely linked to classroom behavior and peer interactions. Prior work shows that exposure to lower-achieving or otherwise at-risk peers increases classroom disruption and crowds out instructional time (Lavy, Paserman and Schlosser, 2012; Kristoffersen et al., 2015; Carrell, Hoekstra and Kuka, 2018). While achievement and behavioral risk are not identical to socioeconomic background, they are empirically correlated with it. Section 3.2 discusses this link in more detail.

[4] This strategy exploits within-teacher and within-school changes in student cohorts while absorbing time-invariant teacher heterogeneity, a common approach in settings where both teachers and students sort across schools.

controlling for school fixed effects, indicating that they are not due to stable differences across schools. Turning to teacher-level data, we compare models with and without teacher fixed effects to distinguish sorting from exposure. While teacher selection explains part of the relationship for overall sick leave, the association with stress-related absence remains essentially unchanged when comparing the same teacher across years in which they face different student populations.

These patterns are robust across a wide range of alternative specifications and placebo tests, including teacher-by-school (spell) fixed effects, controls for peer effects in sickness absence, and local shocks. Together, our findings point to student composition as a salient dimension of teachers' work environment with meaningful consequences for their health. Survey evidence further suggests that these health effects are closely related to aspects of the immediate classroom environment, rather than to differences in general workload or organizational support.

This paper makes three contributions. First, we add to the literature on work environments and worker health by identifying a policy-relevant source of workplace pressure. Recent work demonstrates that both workplaces and job-related pressure exert substantial causal effects on worker health, burnout, and related labor-market outcomes (Ahammer, Packham and Smith, 2023; Nekoei, Sigurdsson and Wehr, 2025), and that workers are willing to trade off earnings to avoid high-pressure jobs (Nagler, Rincke and Winkler, 2025). Related evidence shows that improvements in specific working conditions—such as discretion, work intensity, and working time quality—have an impact on workers' mental health (Belloni, Carrino and Meschi, 2022). However, this literature largely treats pressure as a composite attribute of jobs or workplaces and provides limited evidence on which specific features of the work environment generate it.[5]

We advance this literature by showing that exposure to disadvantaged clients constitutes a distinct and measurable source of workplace pressure that has meaningful adverse effects on workers' mental health. While our empirical setting is teaching, correlational evidence from service work, social work, and medicine highlights emotionally demanding and conflict-ridden interactions with clients or patients as an important source of stress and burnout (Sliter et al., 2010; Shier and Graham, 2011; Dyrbye et al., 2022). Conceptually, this aligns with theories of emotional labor, which emphasize the health costs of sustained interpersonal demands in client-facing jobs (Wharton, 2009). Taken together, this evidence suggests that the mechanism we identify is likely relevant for a broad class of contact-intensive occupations.

Second, we contribute to the literature on school productivity by identifying a mechanism through which student disadvantage can affect schools: a deterioration in teachers' mental health and associated sickness absence. A growing body of work links teachers' mental health to classroom processes that matter for learning, including the quality of interactions with students, classroom climate, and teachers' effectiveness when present. For example, teachers' depressive symptoms are associated with lower-quality classroom learning environments, which in turn mediate effects on student achievement (McLean and McDonald Connor, 2015). Related evidence indicates that poorer teacher mental health is associated with strained teacher–student relationships, greater student distress, and lower in-class effectiveness, although this literature is largely correlational (Oberle and Schonert-Reichl, 2016; Harding et al., 2019; McLean et al., 2020).

A substantial body of work shows that teacher absences reduce instructional time and continuity, lower student achievement, and worsen longer-run outcomes, with particularly adverse effects for disadvantaged students (Miller, Murnane and Willett, 2008; Ronfeldt, Loeb and Wyckoff, 2013;

[5] A broader literature documents links between working conditions and health outcomes using a range of empirical approaches, including within-worker designs (Bentley et al., 2015), panel data on job insecurity (Cottini and Ghinetti, 2018), and policy-induced changes in employment protection (Park and Baek, 2019). For a review of the European economic literature emphasizing both the scope of the evidence and associated identification challenges, see Barnay (2016).

Rivkin and Schiman, 2015; Borgen, Markussen and Raaum, 2024). We contribute to this literature by showing that student composition itself affects teachers' mental health and sickness absence. This identifies a concrete mechanism through which disadvantaged student populations can depress school productivity and contribute to inequality across schools: by increasing health-related disruptions to instruction, both through reduced effectiveness when teachers are present and through higher rates of absence. Our findings thus rovide a plausible mechanism through which socioeconomic differences in student composition across schools may translate into persistent inequalities in educational outcomes (Yang Hansen, Patsis and Gustafsson, 2025).

Third, we contribute to the literature on teacher labor supply, turnover, and sorting by identifying worker health as a plausible mechanism underlying the higher mobility observed in schools serving more disadvantaged students. A large body of research documents that teachers systematically avoid or exit schools with more disadvantaged student populations, contributing to persistent inequalities in teacher quality across schools (Lankford, Loeb and Wyckoff, 2002; Boyd et al., 2005; Jackson, 2009; Karbownik, 2020). Prior work emphasizes the role of non-pecuniary working conditions in shaping these patterns, but lacks direct evidence on the underlying channels through which such conditions affect teachers' labor supply decisions (Falch and Strøm, 2005). We add to this literature by showing that exposure to more disadvantaged student populations worsens teachers' mental health, increases sickness absence, and is associated with higher turnover and exit rates. These findings are consistent with health deterioration operating as an adjustment margin in teachers' labor supply. In this way, our results provide a concrete and measurable mechanism that complements existing evidence on teacher sorting and helps micro-found recent frameworks that emphasize attrition and working conditions as central drivers of staffing challenges and teacher shortages (Edwards et al., 2024; Nguyen, Lam and Bruno, 2024).

Our findings have direct implications for education and labor-market policy. By showing that exposure to more disadvantaged student populations adversely affects teachers' mental health and sickness absence, the results highlight a previously underappreciated cost of educational disadvantage that operates through the teacher workforce. Even if underlying student disadvantage cannot be eliminated or costlessly reallocated across schools, the findings suggest that policies aimed at mitigating its workplace consequences—such as additional classroom support, behavioral resources, or targeted mental-health interventions—may improve teacher well-being, instructional continuity, and retention. More broadly, the results point to worker health as an important margin through which differences in client composition translate into organizational performance in contact-intensive occupations.

2 Institutional Setting

Education in Sweden is composed of four levels: preschool (up to age 7), compulsory education (up to age 16), upper secondary education (ages 17 to 19), and college (age 19 and above). Furthermore, compulsory stage (grundskola) has three stages with the last three years (grades 7 to 9) often labeled as lower-secondary school. Due to data availability and our ability to accurately link teachers and students at school level, we focus on teachers in lower and upper secondary schools. Students in the former group are typically 14-16 years old while in the latter they are 17–19 years old, but a substantial share remain enrolled beyond the expected three years because they enter introductory programs or change programs or schools. These pathways as well as retention are more common among academically weaker students.

Education in Sweden is free and tuition is not permitted. Despite this, socioeconomic segregation between schools has increased markedly in recent decades (Holmlund, Sjögren and Öckert,

2020; Yang Hansen, Patsis and Gustafsson, 2025). Two main channels driving this development were: large refugee inflows starting in the mid-2000s and altering demographic composition of neighborhoods as well as universal school choice and expansion of publicly funded but privately operated school allowing families to opt out of their local school. In lower secondary schools sorting is driven jointly by residential segregation and the school-choice system while in upper secondary schools it arises through residential segregation and program selection with academically stronger students entering academic rather than vocational/introductory tracks. Furthermore, especially in later years of our data, segregation in upper secondary schools has been exacerbated by changes in admission criteria which moved from residence- to merit-based with GPA from lower secondary school being the sorting variable (Söderström and Uusitalo, 2010). Together, these forces produce considerable heterogeneity in student composition between schools, even within the same municipality, causing teachers to face different behavioral and instructional conditions.

Education funding is provided and financed by Sweden's 290 municipalities. By law, it must be allocated on the basis of student needs, and municipalities apply formulas that are more or less compensatory. Although details vary, the common pattern is that schools serving socioeconomically disadvantaged students receive substantially more resources per student (Holmlund, Sjögren and Öckert, 2020). Aforementioned privately operated schools are funded through a voucher paid by the student's home municipality, with the voucher amount based on the municipality's per-student spending, and no top-up tuition is allowed. In larger municipalities, the same compensatory formula is typically used for both municipal and private schools, ensuring that the latter providers receive the same needs-based allocation for the students they serve. In 2024, 16% of compulsory school students and 31% of upper secondary students attended such privately operated schools.

Teaching in Sweden is a regulated profession and while no formal education is required for employment, only certified teachers may hold permanent positions and are authorized to set grades. Certification requires four years of full-time university studies for lower secondary teaching and five to five and a half years for upper secondary teaching. Teachers without certification can be hired on temporary contracts, which offer less job security and are more common in schools facing recruitment challenges. Typical teacher provides instruction in two or more subjects across several grades but most often within a single education level, either lower or upper secondary school in our context. Therefore, the relevant exposure measure to student characteristics is at school-by-year level.

A key institutional feature of the Swedish teacher labor market is the absence of any central allocation mechanism. Teachers are not assigned to schools, rather hiring takes place at the level of individual school or school provider (e.g., private school chain). Teachers apply directly to posted vacancies and principals select candidates based on qualifications, perceived fit, and budgetary constraints. Such decentralized hiring system gives teachers substantial scope to sort across schools according to working conditions, location, and student populations. These institutional features generate clear sorting patterns: teachers in schools with more disadvantaged student populations are, on average, younger and less experienced (Holmlund, Sjögren and Öckert, 2020), and as teachers accumulate experience they tend to move toward schools serving more advantaged populations, where working conditions are perceived as more manageable and turnover is lower.

Teacher salaries are set individually. During the hiring process, principals negotiate wages with teachers within the budgets and pay policies established by the school provider and within the framework of centrally negotiated collective agreements. Although compensatory funding provides disadvantaged schools with more resources overall, principals' ability to convert these resources into higher salaries is limited by municipal human resources policies, internal equity norms, and the compressed wage structure that characterizes the public sector. As a result, wage differentials between schools tend to be modest even when working conditions differ substantially (Holmlund,

Sjögren and Öckert, 2020; Willén, 2021).

We proxy teachers' health with information about their sick leave which is a useful measure due to both its policy-relevance (direct costs to taxpayer) and objectivity (requiring physician verification). Healthcare in Sweden is publicly provided and organized at the regional level. There are 21 regions in the country and they directly employ physicians. Although it is possible that medical assessments differ somewhat by region and most likely across physicians, in principle, doctors should follow national guidelines for diagnoses and certification.[6] All employees in Sweden are covered by the public social insurance system, financed through taxes. During the first two weeks of a sick-leave spell, the employer pays sickness benefits, after which responsibility shifts to the Social Insurance Agency (Försäkringskassan). After seven days of sick leave the employee is required to present a doctor's certificate to the employer. Overall, Swedish institutional arrangements promote relatively consistent measurement of certified sick leave across occupations and employers.

3 Data and Descriptive Statistics

The data for the main analysis are drawn from administrative registers held by Statistics Sweden and the Social Insurance Agency. We also use survey data collected by Statistics Sweden, the School Inspectorate, and the National Agency for Education. Below, we provide a detailed description of the data sources, variable definitions, and descriptive statistics for the main variables of interest and the study population.

3.1 Sick Leave

We use administrative data on sick-leave spells from the Swedish Social Insurance Agency which includes all sick-leave spells lasting at least two weeks and provides information on start and end dates as well as a three-digit ICD-10 diagnostic code describing the certified reason for absence. While sick leave is not a direct measure of health, it captures clinically assessed conditions that are sufficiently severe to prevent work, making it a policy-relevant outcome for both schools and employees. We examine sick leave for any cause as well as for diagnostic categories that plausibly capture conditions related to psychosocial strain in the work environment. Sick leave for any reason is substantively important for schools, as teacher absence affects instructional continuity. Stress-related conditions are most closely linked to adverse work environments, but because symptoms may be difficult to distinguish and diagnostic practices may vary over time and across physicians, we also consider a broader category of psychiatric diagnoses.

We define three primary outcomes: (i) an indicator for whether a teacher had any sick-leave spell lasting longer than two weeks during the school year; (ii) an indicator for whether a teacher had such spell due to a psychiatric diagnosis (ICD-10 codes F: mental, behavioral, and neurodevelopmental disorders); and (iii) an indicator for whether a teacher had such spell due to a stress-related psychiatric diagnosis (ICD-10 code F43: reaction to severe stress and adjustment disorders). Outcomes (ii) and (iii) are subsets of outcome (i). As a placebo outcome, we also examine sick leave due to cancer and diseases of the circulatory system (ICD-10 codes C–D59 and I), which are unlikely

[6]There is evidence from the U.S. that physicians vary substantially in their assessment of patients' eligibility for workers' compensation and sickness benefits (Cabral and Dillender, 2025). The Swedish institutional setting differs importantly in this respect. Sick-leave certification is subject to review by the Social Insurance Agency, which relies on its own medical experts and can reject or modify physicians' certificates. As a result, physician discretion is more constrained than in systems where certification decisions directly determine benefit eligibility. To further address concerns that regional medical practices or certification norms might confound our estimates, we conduct robustness analyses controlling for average sick-leave rates among non-teachers living in the same neighborhood as the teacher.

to respond to short-run changes in the school work environment. Sick leave is coded by school year which runs from August through July. In the teacher-level analysis, we restrict attention to spells that begin during any given school year to better align absences with contemporaneous school conditions. This choice implies that some long-running spells that started earlier are excluded, but it ensures that observed absences can plausibly be attributed to the current work environment.

Sick-leave incidence in Sweden varies substantially over time and profession, reflecting changes in labor-market conditions, eligibility rules, and benefit generosity (Henrekson and Persson, 2004). Figure 1shows the share of individuals with at least one sick-leave spell during the school year (left panel) and with stress-related sick leave (right panel) for compulsory school teachers, upper secondary teachers, and other workers from 2005/06 to 2021/22.[7] Sick leave rates follow broadly similar trends across the three groups: a decline from 2006 to 2010, followed by an increase and subsequent flattening. An exception occurs during the COVID-19 pandemic, when sick leave declined among upper secondary teachers but increased among compulsory school teachers and other workers. This divergence reflects the closure of upper secondary schools while lower school levels largely remained open (Vlachos, Hertegård and B. Svaleryd, 2021). Stress-related sick leave also declined early in the period but has risen steadily since around 2010. Throughout the period, compulsory school teachers exhibit consistently higher sick leave rates than upper secondary teachers.

[Figure 1 about here]

Compared to other occupations, teachers–and especially compulsory school teachers–rank relatively high in terms of stress-related sick leave. Figure 2 shows sick leave prevalence across occupations at the 4-digit level of the Swedish Standard Classification of Occupations (SSYK), restricting attention to occupations with at least 100 individuals. Occupations are ranked by the incidence of any sick leave (left panel) and stress-related sick leave (right panel). Compulsory school (upper secondary) teachers rank at the 52nd (36th) percentile among occupations in terms of overall sick leave but at the 79th (68th) percentile for stress-related sick leave. More broadly, several occupations involving sustained interpersonal interaction appear toward the upper end of the distribution for stress-related sick leave, although the figure is descriptive and does not rely on a formal classification of contact intensity. The occupation with the highest incidence of stress-related sick leave is deacons, a profession that involves close and repeated interaction with individuals facing difficult life circumstances.

[Figure 2 about here]

3.2 Student Composition

To measure the composition of the student body, we create a *Student Index*: a measure based on the socioeconomic background of the students in each school. We start with the *Student Register*, which allow us to link all students in Sweden to their school and grade. Students are then linked to their parents using the *Multigenerational Register* and both groups are further linked to *LISA*

[7] Because sick-leave spells are recorded when they end, very long spells are mechanically underrepresented in the most recent years of the data. We therefore present trends only through July 2022, implying that spells longer than approximately 2.5 years are missing. In the main analysis, however, we use all available data through the 2023/24 school year.

Register to recover their socioeconomic and demographic information. We also add information on grade point average (GPA) in grades 6 and 9 from the *Grade 6* and *Grade 9 Registers*.

We construct the Student Index by regressing GPA in grade 6 – the school year prior to the first grade we consider in the analysis – on a rich set of parental and student characteristics. These include parental education (eight categories), parental income (percentile-ranked within cohort and sex), parental employment status, and receipt of welfare benefits, each interacted with an indicator for being foreign-born. We also include an indicator for whether the biological parents live in the same household, parental and student country/region of origin (10 categories) for immigrant families, and indicators for whether the student immigrated before age 6 or before age 11. The adjusted R-squared for this regression is 0.27 for students in lower secondary schools and 0.30 for students in upper secondary schools. The predicted values from this regression constitute our main independent variable of interest: the *Student Index*. Throughout the paper we use a 1 SD change in student index to quantify our estimates which has a value of 0.30 when computed at school-level (column 1 of Table 1).

The resulting index can be interpreted as a composite measure of students' socioeconomic background that is predictive of their academic performance. Many indicators of socioeconomic background are strongly correlated: households with lower educational attainment, for example, are more likely to have lower income and to receive welfare benefits. By using predicted academic performance based on this information, we account for multiple, correlated dimensions of socioeconomic background simultaneously and summarize them transparently in a single variable. A limitation of this approach is that it does not isolate the contribution of any individual component. For this reason, we also present specifications that include parental education, income, and immigrant status separately. In Section 5.3, we further verify that our results are invariant to using grade 9 GPA (which could be endogenous) and to enriching the index with non-socioeconomic factors that correlate with school performance, such as sex, birth month, and birth order.

The *Student Index* is constructed to predict academic achievement rather than student behavior. However, a large literature suggests that achievement-based peer composition is informative about classroom climate and the demands placed on teachers. Studies exploiting within-school or quasi-random variation show that exposure to lower-achieving or otherwise at-risk peers increases classroom disruption, weakens disciplinary climate, and crowds out instructional time (Lavy, Silva and Weinhardt, 2012; Lavy, Paserman and Schlosser, 2012; Kristoffersen et al., 2015; Carrell, Hoekstra and Kuka, 2018; Balestra, Eugster and Liebert, 2022; Billings and Hoekstra, 2024). While the attributes analyzed in these studies–such as academic achievement, special educational needs, or exposure to disruptive peers–are conceptually distinct, they are empirically correlated with students' socioeconomic background. Consistent with this, descriptive evidence from international assessments documents strong socioeconomic gradients in reported disciplinary climate and student–teacher relations, with schools serving more disadvantaged student populations reporting more frequent disruptions (OECD, 2016, 2019). We therefore interpret the *Student Index* as a parsimonious proxy for systematic differences in peer environments and classroom conditions faced by teachers.

3.3 Survey data

To complement the administrative data and examine whether differences in student composition translate into differences in teachers' work environment, and what specific aspects of work environment are most affected, we draw on three surveys that are described in detail in Appendix A.

The School Inspectorate's Teacher Survey (Skolenkäten) is part of the national quality-assurance system. On a rotating schedule, the School Inspectorate surveys all compulsory and upper-

secondary schools, and in each wave all teachers at participating schools are invited to respond. Results are reported as school-level averages. Although the questionnaire is designed to capture several conceptual domains, the underlying empirical structure is highly compressed, and a factor analysis yields only two underlying dimensions. Based on this analysis, we construct two indices: a general work-environment index and a leadership index. These school-level indices can be linked using school identifiers for years 2013 to 2024.

A key advantage of this survey is its broad coverage and repeated measurement at the school level. A limitation is that it captures a relatively narrow set of work-environment dimensions. Moreover, because the survey is part of the Inspectorate's audit process, schools may have incentives to influence how teachers, students, or parents respond, potentially attenuating informative variation.

The Swedish Work Environment Survey (AMU) is a nationally representative survey of working conditions among the employed population. Responses include personal identifiers and can therefore be linked to administrative records of sick leave and to the school of employment. We construct two sets of work-environment indices from AMU: one based on exploratory factor analysis (EFA) and one based on a theory-driven grouping of items. The survey is fielded biannually from 2006 to 2024.

The main strength of AMU is its high quality and detailed coverage of psychosocial and physical working conditions, combined with the fact that employers are not informed about employees' participation and no results are reported at the workplace level. This reduces concerns that responses are strategically influenced. A limitation in our context is that the questions are not tailored to the educational setting and only indirectly capture classroom-specific conditions. In addition, because the survey targets the entire labor market, the number of responding teachers is relatively small.

The Attitudes to School Survey (ATS) is administered by the National Agency for Education and provides rich information on classroom climate, relations with students and parents, and sources of teacher stress. RResponses are individual but do not contain personal identifiers; however, they can be linked to the school of employment. The ATS is available for years 2012, 2015, and 2024.

The key advantage of the ATS is that it is explicitly designed for the school context and contains detailed measures of classroom interactions and perceived sources of stress. Its main limitations are the small number of survey waves and the absence of personal identifiers, which preclude linking responses to individual administrative records.

Because none of the survey instruments is perfect for our application, we present results from all three. Despite their different strengths and limitations, it is reassuring that the results align closely across data sources.

3.4 Analysis data

Our analysis population consists of all teachers working in lower-secondary (grades 7 to 9) and upper-secondary (grades 10 to 12) schools in Sweden between academic years 2005/06 and 2023/24. We restrict attention to schools with at least six teachers and at least 30 enrolled students. Teachers are identified using the *Teacher Register* which covers all teachers in Sweden employed on October 15 irrespective of the sector (public or private). The register includes information on experience, certification, type of employment contract, and school of employment. We supplement this with demographic and socioeconomic information from the *LISA Register*, including sex, age, age of children in the household, income from employment, and residential location (measured on December 31). In school-level analysis, we use average characteristics of teachers in a given school and year: average age, share male, and share with at least one child under age 7. Finally, *School Register* provides geographic information on school location which we use to distinguish between teachers'

school and residential municipality in some of our robustness analyses.

We also construct auxiliary outcomes related to teacher mobility. For the school-level analysis, we define teacher turnover as the share of teachers in a school who leave and are replaced from one year to the next. This measure captures true teacher replacement rather than changes in staffing levels due to enrollment fluctuations. In the teacher-level analysis, we consider two indicators: (1) if a teacher exits the teaching profession next year and (2) if a teacher switches to a different school next year.

Table 1 presents descriptive statistics for schools in our sample overall and separately for lower- and upper-secondary levels. The sick leave measures are expressed in per 1,000 individuals. On average, 8.7% of teachers at a given school experience at least one spell of sick leave during the year, and 1.8% experience a spell due to stress-related diagnoses. There are some notable differences between lower-and upper secondary schools. In lower secondary schools: i) teachers are more likely to be on sick leave, regardless of diagnostic category, ii) there is a higher share of female teachers, iii) there are fewer uncertified teachers and iv) students have, on average, more advantage background. The last point reflects the fact that some students with weaker academic performance remain enrolled in upper-secondary school beyond the expected three years.

[Table 1 about here]

There is considerable variation in sick leave across schools. Figure 3 shows the density of school-level sick leave rates—both for any-cause and stress-related diagnoses—averaged over the period 2016–2019. We observe substantial heterogeneity in teacher sick leave across schools for both outcomes. The distribution of stress-related sick leave is more right-skewed, with 35% of schools recording no stress-related sick leave spells during the period.

[Figure 3 about here]

4 Empirical Strategy

Our objective is to estimate how student composition affects teachers' health. The empirical strategy consists of two complementary parts. First, we use school-level variation to describe how teacher sick leave differs across schools serving different student populations. These models answer the descriptive question of whether teachers in schools attended by more advantaged students exhibit better health outcomes, but they are not intended to identify causal effects, since both students and teachers sort non-randomly across schools. Second, we estimate teacher-level models with teacher fixed effects. These models compare the same teacher across years in which they face different student cohorts. Year-to-year demographic shifts generate substantial within-school variation in student composition that is plausibly unrelated to an individual teacher's unobserved, time-varying health determinants. Under this assumption, the teacher–FE specifications isolate the effect of exposure to different student populations. This source of variation is commonly used in the peer-effects literature; see, for example, Carrell and Hoekstra (2010); Carrell, Hoekstra and Kuka (2018).

There are three sources of variation in our *Student Index*: (i) across schools, (ii) within schools over time, and (iii) within teachers over time. Schools differ systematically in the characteristics of the students they serve, but since both students and teachers sort to schools endogenously any

cross-school comparisons should be treated descriptively. When it comes to within-school variation, student cohorts vary considerably from year to year due to demographic fluctuations, residential mobility, and program choices in upper secondary school. Nonetheless, even when controlling for school fixed effects there still could be selection of teachers based on their unobserved characteristics. Thus, being able to use individual-level data to address at least time-invariant unobservables is critical from identification standpoint. Conditional on a teacher being employed at a given school in year t, the cohort-to-cohort shifts are not chosen by the teacher and therefore constitute the primary source of identifying variation in our preferred teacher fixed-effects models. This variation arises both because cohorts change within a school over time and because some teachers move between schools and thereby face different student populations. Given that teacher mobility is potentially endogenous – moves may be a result of changes in working conditions or health – it represents a threat to identification in our models. Our baseline identifying assumption is that, conditional on teacher fixed effects and common time shocks, year-to-year changes in the student composition a teacher faces are uncorrelated with teacher-specific, time-varying health shocks. To assess sensitivity to endogenous mobility, we report specifications with spell (teacher-by-school) fixed effects, which identify treatment effects solely from cohort-to-cohort changes within a given teacher–school match.

The school-level analysis is represented by the following model relying on time and spatial variation in student index:

$$Y_{st} = \alpha + \beta SC_{st} + \gamma_{ctl} + (\delta_s) + \Theta X_{st} + \varepsilon_{st} \tag{1}$$

where s indexes schools, c indexes county, t indexes years, and l indexes school-level (lower- or upper-secondary). Y_{st} are the school-by-year level averages of outcome variables including any teacher sick leave, sick leave related to psychiatric diagnoses, stress-related sick leave, teacher turnover as well as a placebo outcome of sick leave due to cardiovascular and cancer diagnoses. Our treatment variable of interest, SC_{st}, is an index of student characteristics aggregated at school-by-year level. Higher values of this variable imply more positively selected students in terms of observable characteristics.

All specifications include county-by-year-by-level fixed effects, γ, which ensures that we compare schools within regions and the same level of schooling. As discussed above, the health care system is organized at the regional level, which may lead to regional differences in the leniency with which doctors issue the certificates required for receiving benefits. The reasons to control for level of schooling trends are that teacher characteristics may differ systematically, for example upper secondary school teachers typically have a higher educational attainment, and that teaching demands may vary depending on student age. A vector of control variables, Θ, further includes: average teacher age (linearly and squared), fraction of teachers having children under 10, fraction of male teachers, and log number of students. Finally, in select specifications we include school fixed effects δ. Standard errors are clustered at school level.

The coefficient of interest in Equation 1 is β which describes the relationship between student composition and teacher health at school level. In order to interpret it causally we need to make two assumptions: (1) that there is no sorting of students based on average health of teachers in schools and (2) that there is no sorting of teachers based on average characteristics of students in school. Since at least the latter assumption is unlikely to hold, we treat the school-level analysis as a descriptive exercise that nonetheless is of interest to policy makers that might want to understand whether school with particular demographic composition have teachers who are more or less likely to be on sick leave.

We then move to teacher-level analysis where an estimating equation takes the following form:

$$Y_{ist} = \alpha + \beta SC_{st} + \gamma_{ctl} + (\xi_i) + (\psi_{is}) + \Theta X_{it} + \varepsilon_{ist} \quad (2)$$

where s, c, t and l are defined as above while i indexes individual teachers. Y_{ist} are the aforementioned outcome variables of interest, measured at individual level, for teacher i, employed in school s, in a given school year t. Variable SC_{st} and fixed effects γ are identical to those in Equation 1. Control variables, X_{it}, are measured at the individual level and include: teacher age, indicator for having a child under age 10, and male dummy. In our main specifications we include teacher fixed effects (ξ), controlling for observable and unobservable time-invariant teacher characteristics. As a robustness test we further include teacher-by-school effects (ψ), identifying the coefficient of interest (β) off only over time changes in student composition in a given school.[8] Since we observe each teacher multiple times we cluster the standard errors two-way at school and teacher level.

The coefficient of interest in Equation 2 is β and it describes the relationship between student composition and teacher health at individual level. In this case our identifying assumption, in a specification including teacher fixed effects, is that there are no unobserved time-varying factors which would be correlated with changes in student composition and also affect teacher's health. Thus, although we do not need to worry about student sorting – unless students somehow sort on unobserved future changes in teachers' health – we still need to consider teacher sorting. For example, if teachers choose schools based on their ability to predict future changes in student composition or if there are local (economic) shocks that affect both student composition and teachers' health that would bias our estimates. We address both of these concerns in Section 5.3.

Irrespective of the level of the analysis, our coefficients of interest estimate "contemporaneous effects" of student characteristics. Thus, they answer a question of whether negative/positive changes in student composition in a given year affect teachers' health in the same year.[9] Another question that could be of interest is whether cumulative (rather than temporal) exposure to students with different characteristics affects teachers' health, but our design does not allow us to identify such effects. To the extent that temporal effect accumulate over time, likely with some discount factor across years, we can consider our estimates as a lower bound on potential cumulative exposure.

5 Main results

This section examines the relationship between student socioeconomic composition and teachers' health outcomes, combining descriptive school-level associations with teacher-level models that exploit within-teacher variation across cohorts to distinguish sorting from exposure. We begin by using survey data to document how student composition is related to teachers' reported work environment and to establish school-level associations between work environment measures and teacher sick leave. We then turn to full population administrative data on teachers and schools from the school years 2005/06 to 2023/24.

The results are presented in four steps. First, we document school-level associations between student composition and teachers' health outcomes. Second, we estimate teacher-level models with teacher fixed effects. Third, we assess the robustness of our findings and examine auxiliary

[8] In Section 5.2 we document that student index affects the likelihood that teacher changes schools or exits the profession. Therefore, the teacher-school fixed effects can be thought of as "bad controls" given that they implicitly account for moving. For this reason we do not use this specification as our preferred model but rather include it for completeness and robustness.

[9] Nekoei, Sigurdsson and Wehr (2025) show that individuals who take sick leave due to stress begin reporting slightly elevated stress symptoms as early as three quarters before the spell begins, with symptoms gradually increasing up to the onset of leave. Thus, the progression from stress symptoms to sick leave appears to be fairly rapid.

outcomes, including teacher mobility and earnings. Finally, we present heterogeneity analyses along four dimensions: teacher sex, experience, certification status, and school ownership (public versus private). Given the differences documented in Table 1, we present our main school- and teacher-level results both pooled across school levels and separately for lower- and upper-secondary schools.

5.1 School-level analysis

Our first set of results examines whether student composition is systematically related to teachers' work environment and whether differences in work environment are, in turn, associated with teachers' sick leave. These analyses use data from the Swedish School Inspectorate's Teacher Survey, which provides school-level measures of the work environment for a subsample of schools between 2013/14 and 2023/24. The data are described in more detail in Section 3.3 and Online Appendix A, where we also detail the construction of the work-environment index. Briefly, the index is based on a factor-analysis component capturing perceived school climate, including safety, support, adjustment to student needs, and practices against abuse (see Table A1 for the underlying items).

Table 2 presents the results. Columns 1–4 relate the work-environment index to teacher sick leave, while columns 5–6 relate student composition to the work environment. All specifications include year-by-school-level fixed effects, and the even-numbered columns additionally include school fixed effects, identifying coefficients from within-school changes over time. While these estimates are descriptive, they directly inform the mechanism underlying our research hypothesis by establishing that schools serving more disadvantaged students exhibit systematically worse work environments and that poorer work environments are associated with higher teacher sick leave.

[Table 2 about here]

Three facts emerge from Table 2. First, both across and within schools, we find a strong negative association between the quality of the work environment and teacher sick leave, as well as a strong positive association between student composition and the work environment. Schools serving more advantaged students report better work environments, and schools with better work environments exhibit lower rates of teacher sick leave, particularly for stress-related diagnoses. These patterns are consistent with the conceptual mechanism outlined above.

Second, adding school fixed effects substantially attenuates the associations for any-cause sick leave and for the work-environment index itself, but has much smaller effects on the relationships involving mental-health-related sick leave. This indicates that variation in mental-health outcomes is driven to a larger extent by within-school changes over time rather than by stable differences across schools, pointing to student composition as a plausible time-varying factor—a hypothesis we examine more directly in the teacher-level analysis.

Third, the estimated associations are economically meaningful and remain statistically significant at conventional levels even when identified from within-school variation. For example, a one standard deviation increase in the student index is associated with a 0.048 standard deviation improvement in the reported work environment. A one standard deviation increase in the work environment index is associated with a 5% reduction in any-cause sick leave and a 12% reduction in stress-related sick leave, relative to the sample mean. While these relationships are descriptive, their magnitude underscores that differences in student composition are closely linked to salient aspects of teachers' working conditions and health.

We now move on to estimate school-level relationships between student composition and teachers' health, following the specification in equation (1). We expand the analysis to the full population

of Swedish lower- and upper-secondary schools observed annually between the school years 2005/06 and 2023/24, allowing us to describe how teacher sick leave varies systematically with student composition across schools and over time. These results are visually presented in Figure 4 and quantified in Table 3.

[Figure 4 about here]

Figure 4 illustrates the cross-sectional relationship between student composition and teacher sick leave. We residualize the data with year-by-school-level fixed effects to account for general trends and plot binned averages, where each point represents approximately five percent of the school–year observations. A clear downward gradient emerges: schools serving more advantaged student populations (indicated by higher values of the student index on the x-axis) exhibit lower rates of overall sick leave, as well as sick leave related to psychiatric and stress diagnoses. The magnitudes are sizable. Moving from the 25th to the 75th percentile of the student-index distribution is associated with reductions in overall, psychiatric, and stress-related sick leave of approximately 0.70, 0.28, and 0.16 percentage points (pp), respectively. Relative to the sample mean, these correspond to declines of 8.0%, 9.1%, and 8.7% for the three outcomes.

We now present school-level regression estimates in Table 3. Columns 1–3 report baseline specifications without additional controls. Columns 4–6 sequentially add aggregated student demographics, school fixed effects, and both jointly. The final two columns replicate the fully saturated specification separately for lower- and upper-secondary schools. The table reports associations between the student index and five outcomes: any-cause sick leave (Panel A), sick leave due to psychiatric diagnoses (Panel B), sick leave due to stress-related diagnoses (Panel C), sick leave due to cardiovascular and cancer diagnoses–which we treat as a placebo outcome (Panel D), and teacher turnover (Panel E). To facilitate interpretation, all sick-leave outcomes are expressed as incidences per 1,000 teachers.

[Table 3 about here]

In the baseline specification (column 1), which includes only county-by-year-by-school-level fixed effects, we find a strong negative association between student composition and teacher sick leave. The coefficient of 24.9 for overall sick leave implies that a one standard deviation increase in the student index (0.30) is associated with about 9.0 fewer sick-leave cases per 1,000 teachers, corresponding to a 10.3% reduction relative to the sample mean. Effects of similar magnitude emerge for psychiatric and stress-related diagnoses. Columns 2 and 3 split the sample into lower- and upper-secondary schools and show that the associations are comparable across school levels, although relative effect sizes are larger in upper-secondary schools due to lower baseline absence rates. For example, stress-related sick leave declines by 12.1% in upper-secondary schools compared to 6.4% in lower-secondary schools.

Adding aggregated school-level controls in column 4 attenuates the point estimates by up to 19 percent relative to the baseline, indicating that part of the raw association reflects differences in observable school characteristics. Column 5 introduces school fixed effects, isolating within-school changes in student composition over time. This adjustment reduces the association for overall sick leave by roughly one-third, but leaves the estimates for mental-health-related outcomes largely intact—and in fact increases them for psychiatric diagnoses (by about 15%) and stress-related diagnoses (by roughly 50%). This pattern suggests that within-school changes in student composition are particularly relevant for teachers' mental health outcomes.

Our preferred specification (column 6), which includes both school fixed effects and the full set of controls, shows that a one standard deviation increase in the student index is associated with reductions of 4.2, 3.2, and 2.5 sick-leave cases per 1,000 teachers for overall, psychiatric, and stress-related diagnoses, respectively. Relative to the corresponding sample means, these effects amount to 4.8%, 10.2%, and 13.6%. Columns 7 and 8 confirm that the mental-health effects remain larger in upper-secondary schools.

Panel E shows that teacher turnover is also systematically related to student composition. In the within-school specification (column 6), a one standard deviation increase in the student index is associated with a 0.57 percentage point reduction in annual teacher turnover, corresponding to an 8.1% decline relative to the mean. This result is consistent with earlier evidence documenting higher teacher turnover in schools serving less advantaged students (Jackson, 2009).[10].

Finally, we turn to the placebo outcome—sick leave due to cardiovascular and cancer diagnoses (Panel D). In the baseline specification, the student index is weakly associated with this outcome, consistent with the possibility that pooled estimates partly reflect sorting across schools. However, once school fixed effects and controls are included (column 6), the estimated coefficient becomes small (0.11 cases per 1,000) and statistically insignificant. While this does not rule out all forms of selection, the absence of a robust relationship for an outcome that should not plausibly respond to student composition is reassuring and supports the interpretation that the main results are not driven by generic differences in health or sickness certification across schools.

5.2 Teacher-level analysis

The school-level results are important from a policy perspective because they capture the patterns of teacher absence that students actually experience. In schools serving more disadvantaged student populations, teacher sick leave–especially for mental-health-related reasons–is markedly higher, implying less stable and less continuous instruction for those students. We now examine whether these differences reflect teacher sorting across schools or the direct effects of exposure to particular student populations.

To address this question, we move to individual-level data that allow us to include teacher fixed effects. This approach absorbs time-invariant differences across teachers–such as preferences, baseline health, or unobserved traits–that may influence both workplace choice and propensity for sick leave. Under the assumption that within-teacher changes in student composition are not systematically related to unobserved time-varying factors that also affect teacher health, the estimated coefficients can be interpreted as capturing the causal effect of student composition on teachers' health. All specifications include county-by-year-by-school-level fixed effects, and standard errors are two-way clustered at the teacher and school levels.

Table 4 presents the teacher-level results, estimated both without and with teacher fixed effects. In the pooled specification, which includes basic controls for teacher demographics but no teacher fixed effects (column 1), a 1 SD increase in the student index is associated with approximately 5.1 fewer cases of any-cause sick leave per 1,000 teachers (a 7.1% decline relative to the sample mean). For psychiatric diagnoses, the corresponding reduction is about 2.1 cases per 1,000 teachers (9.1%), while for stress-related diagnoses it is around 1.3 cases per 1,000 teachers (9.6%). These magnitudes are comparable to those obtained in the school-level analysis.[11]

[10]We present a binscatter of the relationship between student composition and teacher turnover in Figure B1.

[11]The main difference between the school-level and teacher-level models is that the teacher-level outcome is restricted to sick-leave spells that begin in the current year, whereas the school-level regressions also include spells that began in earlier years. In addition, some schools are dropped from the school-level regressions because they appear only once in the data. Finally, the models differ in their implicit weighting of schools, as schools with more teachers

[Table 4 about here]

When teacher fixed effects are introduced (column 2), a 1 SD increase in the student index reduces any-cause sick leave by 3.9%, psychiatric diagnosis sick leave by 5.1%, and stress-related sick leave by 9.4%; relative to their respective sample means. Although the estimated effect for any-cause sick leave declines by roughly 46% compared to the pooled specification, the magnitude remains economically meaningful. The attenuation for overall and psychiatric sick leave suggests that part of the cross-sectional relationship reflects sorting of teachers with poorer general or psychiatric health into schools serving more disadvantaged students. In contrast, the estimate for stress-related sick leave remains almost unchanged whether we include or exclude teacher fixed effects–at around 1.3 fewer cases per 1,000–indicating that this relationship is unlikely to be driven by sorting.

Columns 3 and 4 split the sample into lower- and upper-secondary schools.Across both school levels, we find economically meaningful and precisely estimated negative effects on mental-health-related sick leave. For any-cause sick leave, the estimated effects are larger in lower-secondary schools. However, because baseline sick-leave rates are higher in earlier grades, the differences in relative effect sizes are more modest. Specifically, we estimate a 6.1% reduction in any-cause sick leave in lower-secondary schools compared to 3.8% in upper-secondary schools. The corresponding reductions for stress-related sick leave are 11.0% and 12.7%, respectively.[12]

As in the school-level analysis, the placebo outcomes–sick leave due to cardiovascular and cancer diagnoses–shown in Panel D exhibit no statistically significant relationship with student composition. The estimated coefficients differ in sign across school levels, and the pooled estimate allows us to rule out, at the 95% confidence level, effects larger than 0.30 or smaller than -0.17 cases per 1,000 teachers. By comparison, our preferred estimates for mental-health-related outcomes in Panels A–C imply reductions of between 1.2 and 2.7 cases per 1,000 teachers—at least seven times larger than the lower bound of the placebo confidence interval. This contrast supports the interpretation that the main results are not driven by generic health differences or sickness-certification practices.

Taken together, the teacher-level results indicate that exposure to more advantaged student populations improves teachers' mental health, even when comparing the same teacher across different school environments. The persistence of the stress-related effects after accounting for teacher fixed effects suggests that they are not primarily driven by systematic sorting of healthier teachers into less demanding schools. Instead, the evidence points toward a causal impact of student composition on teachers' health, plausibly operating through work-related stress and psychosocial strain, a question we return to in Section 6.

Our analysis so far has relied on the student index, which provides a parsimonious summary of the socioeconomic composition of a school. While this composite measure is useful for estimation, policymakers may also be interested in which underlying dimensions of student background are most closely related to teacher health. To shed light on this, we decompose the index into three key predictors of student achievement and include their school-by-year averages as alternative regressors: the share of students with a foreign background, the share of students whose mothers hold at least a bachelor's degree, and the percentile rank of fathers' income. As shown in Appendix Table B2, these variables are highly correlated at the school level. We therefore report estimates

receive greater weight in the teacher-level regressions. This last difference has a negligible impact on the results (see the weighted school-level estimates in Appendix Table B1).

[12]In Panels B and C, the pooled estimates in column 2 do not mechanically lie between the estimates for lower- and upper-secondary schools reported in columns 3 and 4. This is because the pooled specification restricts the coefficients on control variables to be the same across school levels, rather than allowing for level-specific relationships.

where they are entered both separately and jointly in Appendix Table B3.

When included separately (columns 1, 3, and 5), all three components are statistically significant predictors of teacher sick leave across outcome categories, including any-cause, psychiatric, and stress-related absence. Higher shares of students with a foreign background are associated with higher rates of teacher sick leave, whereas higher parental education and income are associated with lower sick leave. When the three components are included jointly, the coefficients become less precisely estimated, reflecting their strong collinearity. In this specification, the coefficient on fathers' income attenuates substantially and changes sign for psychiatric diagnoses, indicating limited independent predictive content once other dimensions of background are accounted for. By contrast, the shares of students with a foreign background and with highly educated mothers remain relatively stable in sign and magnitude across outcomes.

Focusing on stress-related sick leave in the joint specification (column 6), a 1 SD increase in the share of students with highly educated mothers (0.14) is associated with a 7.1% reduction in leave incidence, while a 1 SD decrease in the share of students with a foreign background (0.18) corresponds to a 5.1% reduction, although the latter estimate is marginally statistically insignificant. Consistent with earlier results, we find no systematic relationship between any of these components and placebo outcomes for cardiovascular or cancer-related sick leave (columns 7 and 8).

5.3 Robustness and alternative explanations

The results in Section 5.2 provide strong evidence that changes in student composition affect teachers' health, as reflected in higher rates of stress-related and psychiatric sickness absence. In this section, we assess the robustness of this result and examine alternative explanations that could account for the observed patterns. We proceed in four steps. First, we consider whether the estimated effects could reflect workplace peer effects or correlated local shocks rather than direct exposure to students. Second, we examine the sensitivity of the results to alternative econometric specifications and sample definitions. Third, we assess robustness to alternative constructions of the student index. Finally, we address concerns about reverse causality.

We begin by examining two potential confounders: (i) workplace peer effects operating through norms or spillovers among teachers, and (ii) local shocks that are correlated with both student composition and teachers' health.

The first mechanism posits that student composition may affect some teachers' absence behavior, which could then spill over to colleagues through workplace norms or organizational constraints. For example, stress may increase when colleagues are frequently absent, increasing workload for remaining teachers, or sick-leave behavior may respond to shared norms regarding absence-taking. If such peer effects are correlated with student composition, they could bias estimates upward even in the absence of a direct effect of student exposure. Prior work has documented peer effects in workplace behavior, including teaching practices (Jackson and Bruegmann, 2009), sickness absence (Hesselius, Nilsson and Johansson, 2009; Godøy and Dale-Olsen, 2018), as well as related spillovers in welfare utilization (Dahl, Løken and Mogstad, 2014).

The second potential confounder concerns local shocks that affect teachers' mental health or sickness absence and coincide with changes in student composition. For example, teachers working in schools with more advantaged student populations may live in more affluent neighborhoods, with better access to healthcare services or different medical standards when approving sick leave. Such systematic differences could lead us to incorrectly attribute differences in sickness absence to student exposure, thereby biasing the estimated effects.

To address concerns about workplace peer effects, we control for mean lagged sick leave among

other teachers at the same school (leave-one-out), capturing contemporaneous norms or spillovers in absence behavior. To account for correlated local shocks, we additionally include sick leave incidence—measured for the same diagnostic category—among employed residents aged 25–65 living in the teacher's residential neighborhood.[13] Finally, we estimate specifications that include municipality-by-year fixed effects, absorbing any time-varying shocks for each of Sweden's 290 municipalities.

The results, reported in Table 5, show that the coefficients on the student index are virtually unchanged when these additional controls are included. This suggests that workplace peer effects and correlated neighborhood shocks are unlikely to confound the estimated relationship between student composition and teacher health. We do find some evidence of peer effects for overall sick leave, but not for psychiatric or stress-related absences. Similarly, regional sick-leave rates among non-teachers are predictive of teachers' absence behavior, indicating that local conditions matter for sickness absence more broadly. Importantly, however, this variation is orthogonal to student composition at the school level and does not affect the estimated impact of student exposure.

[Table 5 about here]

We next assess the robustness of our findings to alternative model specifications, definitions of the treatment variable, and sample restrictions. Table 6 summarizes these results and shows that the relationship between student composition and teacher sick leave is highly stable across specifications. Column 1 reproduces our preferred estimates from Table 4 for reference.

Column 2 introduces spell fixed effects (teacher-by-school), thereby exploiting only changes in student composition within a teacher's tenure at the same school. This specification controls for both unobserved teacher heterogeneity and school-specific selection that may correlate with student characteristics and teacher health. Because teacher mobility itself responds to student composition (Tables 3 and 7), conditioning on spell fixed effects risks absorbing an endogenous adjustment margin. We therefore interpret this specification as a robustness check rather than a preferred estimate.

[Table 6 about here]

Columns 3 and 4 add municipality-by-year-by-school-level fixed effects to flexibly capture local labor-market and demographic shocks by school location (column 3) or by teacher residence (column 4). Identification in these models come from variation across schools and cohorts within municipalities. This approach substantially reduces identifying variation, particularly in small municipalities with only one school, but the estimated effects remain similar in magnitude.

Column 5 adds a control for the within-school dispersion of the student index to examine whether teacher health responds to the average level of student disadvantage or to heterogeneity within the student body. While prior research suggests that teaching more heterogeneous classes may increase workload and stress (Pozas, Letzel-Alt and Schwab, 2023), the coefficient on the student index is essentially unchanged. This indicates that the results are driven by the level of student disadvantage rather than by variation in student mix within schools.

Next, we assess robustness to alternative constructions of the student-composition index and to sample restrictions. In column 6, we reweight the underlying variables by predicting grade 9 rather

[13] Until 2014, neighborhoods are defined by parish; from 2015 onward we use the nationwide DeSO classification. Sweden has approximately 1,400 parishes and 6,000 DeSOs, with most DeSOs containing between 700 and 3,000 residents.

than grade 6 GPA, allowing later achievement to define student disadvantage. In column 7, we further augment the index by adding sex, birth month, and birth order (on the mother's side) to the set of predictors. A large literature shows that these characteristics systematically predict academic achievement, so this specification captures a broader notion of expected performance.[14] Finally, we test sensitivity to sample composition by excluding, respectively, the Stockholm metropolitan area—the largest and most heterogeneous school market in Sweden—and the post-2019 period, to ensure that the COVID-19 years do not drive the results.

We calculate effect sizes as percentage changes relative to the mean induced by a one standard deviation increase in the student index. Across specifications, the estimated effects for any-cause sick leave range from 3.0% to 4.8%; for psychiatric diagnoses from 4.5% to 10.5%; and for stress-related sick leave from 8.6% to 12.4%. Our preferred estimates (column 1)–3.9%, 5.1%, and 9.4% for the three outcomes, respectively–lie toward the lower end of these ranges and can therefore be viewed as conservative. Overall, the results are robust to a wide range of reasonable variations in the econometric specification.

Our final robustness check addresses reverse causality. If teachers' health affected student composition rather than the other way around, then sick-leave incidence in a given year should predict the student index in the subsequent school year. We test this hypothesis in Appendix Table B4 and find no empirical support for such a relationship. The only estimate approaching statistical significance in column 1 is small in magnitude. We therefore conclude that reverse causality is unlikely to meaningfully bias our results.

5.4 Additional outcomes: mobility and earnings

Given the documented relationship between student composition and teachers' health, it is natural to ask whether student composition also affects other aspects of teacher labor supply. A large literature documents that teachers are more likely to leave or avoid schools serving disadvantaged students (Jackson, 2009; Karbownik, 2020), and our school-level results show higher turnover in such schools (Panel E of Table 3). In addition, schools facing more challenging student environments may offer higher pay to attract and retain teachers, connecting our analysis to the literature on compensating wage differentials (Falch, 2011; Lavetti, 2023).

We study these outcomes using teacher-level data and the same teacher fixed effects framework as in the health analysis. Table 7 reports results for three outcomes: the probability of switching schools between years (Panel A), the probability of leaving the teaching profession (Panel B), and annual earnings (Panel C). Column 1 presents pooled estimates with teacher fixed effects, while Columns 2 and 3 report results separately for lower- and upper-secondary schools.

[Table 7 about here]

Panels A and B show that exposure to more advantaged student populations reduces both school switching and exits from teaching. The effects are economically meaningful for within-profession mobility: a 1 SD increase in the student index reduces the probability of switching schools by 25.1% relative to the mean. Effects on leaving the profession are smaller but still notable, at 5.8% relative to the mean. These patterns suggest that student composition primarily affects *where* teachers work rather than *whether* they remain in teaching. Consistent with prior evidence for

[14] See Autor et al. (2023) for gender gaps in achievement and discipline; Black, Devereux and Salvanes (2005) and Breining et al. (2020) for birth-order gradients; and Bedard and Dhuey (2006) and Dhuey et al. (2019) for achievement effects driven by school starting age rules.

Sweden (Karbownik, 2020), the mobility response is stronger for switching schools than for exits from the profession, with particularly large effects in lower-secondary schools. The magnitudes are broadly comparable to those reported in that study, which documents substantial reductions in both within-teaching mobility and exits from the profession following exogenous changes in student composition.[15]

Panel C reports results for earnings. In line with compensating wage differentials, teachers earn slightly higher wages in schools serving more disadvantaged students. Although statistically significant, these effects are modest in magnitude: a 1 SD increase in the student index raises annual earnings by at most 0.5%. Small effects may reflect the fact that wage bargaining, social norms, and local teacher policies give limited scope for either within- (for stayers) or between-school (for movers) wage differences.

Taken together, these results indicate that differences in student composition not only affect teachers' health but also shape labor-market dynamics within the profession. Teachers working in more disadvantaged schools are more likely to move to other schools or to leave teaching altogether, while those who remain appear to receive only negligible wage compensation. The observed pattern is consistent with schools in challenging environments facing persistent difficulties in retaining staff, plausibly due to limited scope for adjustments in wages and the inability to provide other non-pecuniary benefits that could offset the negative effects of student composition.

5.5 Heterogeneity

Having documented that student composition affects teachers' health on average, we now move to examining if these effects vary across teacher and school characteristics. We consider three teacher characteristics–sex, experience, and certification status–as well as if schools are managed by public authorities of private actors. As shown in Table 4, effect sizes for mental health are comparable across school levels, while they are larger in lower-secondary schools for any-cause sick leave. We examine heterogeneity by interacting the student index with subgroup indicators within our full teacher-level specification, including teacher fixed effects and the complete set of controls. Coefficients on the student index represent effects for the baseline group, while interaction terms capture differential effects across subgroups. Table 8 reports the results.

Before turning to the interaction estimates, it is worth noting that female teachers exhibit substantially higher levels of sick leave than male teachers, including for mental-health-related diagnoses. By contrast, baseline differences are much smaller across experience, certification status, and school ownership. Despite these level differences, we do not find statistically significant heterogeneity by gender (columns 1–3) or by certification status (columns 7–9). Although point estimates are smaller in absolute terms for men than for women, the higher baseline sick-leave rates among women imply that percentage effect sizes are in fact larger for men. A one standard deviation increase in the student index is associated with reductions ranging from 5.0% (any-cause sick leave) to 12.5% (stress-related sick leave) for men, compared to 3.4% to 8.0% for women.

[Table 8 about here]

In contrast, we find clear and statistically significant heterogeneity by teacher experience (columns 4–6) and school ownership (columns 10–12). Effects are substantially larger for less experienced teachers. For teachers with fewer than 10 years of experience, a 1 SD increase in the student index

[15] Karbownik (2020) reports a 4-year reduction in within-teaching mobility of 82.2% and an outflow reduction of 28.7%. Under a linear approximation, this corresponds to annual effects of roughly 20.6% and 7.2%, respectively.

reduces sick leave by between 6.4% (any cause) and 12.8% (stress-related). For teachers with 10 or more years of experience, the corresponding effect sizes range from 2.2% to 9.2%. Several mechanisms may account for this pattern. More experienced teachers may be better equipped to manage disruptive or otherwise challenging classroom environments; teachers who remain in the profession may be positively selected on resilience or coping skills; or they may sort into schools that provide stronger institutional support when serving disadvantaged student populations. While our data do not allow us to distinguish between these mechanisms, the results point to early-career teachers as a group that is particularly sensitive to changes in student composition.

Estimates by teacher certification status (columns 7 to 9) reveal limited evidence of systematic heterogeneity. None of the interaction terms are statistically significant, indicating that we cannot reject equal effects across certified and uncertified teachers. At the same time, the point estimates suggest a potentially meaningful difference for any-cause sick leave. Specifically, we find that uncertified teachers tend to be much more elastic compared to certified teachers when it comes sick leave not related to mental health. We infer this from the fact that effects for these two groups are comparable for sick leave due to psychiatric diagnoses (-5.6% and -6.0% for certified and uncertified teachers, respectively) and stress-related diagnoses (-10.5% and -9.1%), but not for any sick leave. Considering this last outcome we find that a 1 SD increase in student index reduces sick leave of certified teacher by only -3.5% but for uncertified teachers this effect sizes is more than twice as large at -7.4%. Although these differences should be interpreted cautiously given the lack of statistical significance, they suggest that uncertified teachers may be more responsive along the margin of general health-related absence. One possible explanation is that uncertified teachers are more likely to work in disadvantaged schools, where marginal improvements in student composition yield larger gains in overall working conditions and health.

Given the growing role of private provision in K-12 education in Sweden and elsewhere (Böhlmark and Lindahl, 2015; Figlio, Hart and Karbownik, 2023), it is policy-relevant to assess whether student composition differentially affects teachers' health in public and private schools. In Sweden, privately managed independent schools tend to employ teachers who are less experienced and less likely to be certified, and they operate with higher student–teacher ratios than public schools (Vlachos, 2019; Holmlund, Sjögren and Öckert, 2020; Edmark and Persson, 2021; Berg, 2025). This suggests potentially different margins of adjustment to student disadvantage. Columns 10 to 12 show that improvements in student composition are associated with substantially larger reductions in teacher sick leave in private schools than in public schools, across all diagnostic categories. Effect sizes in the private sector are between 2.6 and 3.7 times those in public schools. Importantly, the estimated effects remain negative and statistically significant for public schools as well (Table 8), indicating that the main results are not driven by private-school dynamics. While the data do not allow us to identify the mechanisms underlying this difference, the results suggest that teachers' health in private schools is more sensitive to changes in student composition.

6 What differs in the work environment?

The analyses so far documented robust effects of student composition on teachers' health and a degree of heterogeneity in these estimates. With additional data, we now turn to exploring why such findings arise. We propose two plausible mechanisms: (1) schools serving more disadvantaged students may provide a less pleasant or more conflict-prone work environment, and (2) they may impose higher quantitative workload demands on teachers. To examine these potential explanations, we draw on two complementary data sources. The first is the Swedish Work Environment Survey (AMU), a biannual, nationally representative survey that we link our administrative data at the

individual level. The second is the Attitudes to School (ATS) survey, carried out among teachers in 2012, 2015, and 2024. ATS is school-specific and covers perceptions of classroom climate, relations with students and parents, and sources of stress. While ATS cannot be linked to individual health outcomes, it allows us to relate perceived school climate directly to student composition. Details on survey design, coverage, and index construction are provided in Appendix A.

Using the AMU items, we construct two sets of indices that summarize key aspects of the perceived work environment. The first set is based on an exploratory factor analysis (EFA), which groups items into seven empirical clusters.[16] The second set is based on a theory-driven grouping of items into five conceptually relevant domains. The two approaches overlap but are not identical. In order to be able to compare estimates, we standardize the indices which puts all measures on a comparable scale across domains and survey years. The ATS survey contains school-specific questions that map directly onto the mechanisms of interest. We therefore analyze these items individually rather than aggregating them. The measures we use include teachers' overall satisfaction with the school, perceived class size, the level of classroom order, respect from students and parents, exposure to threats or violence, perceived meaningfulness of work, and self-reported stress. These items capture dimensions of the school climate that are not available in AMU and provide complementary information on perceived work conditions at the school level.

Before relating these measures to student composition, we first verify that they are informative about teachers' health. We have already documented at school level that improvements in work environment are negatively associated with sick leave incidence, but now we enrich this analysis with individual level data and investigate specific domains of the previously used index (Table 2). Appendix Table B6 reports regressions of sick leave on each AMU index, controlling for teacher age, sex, certification status, and year-by–school-level fixed effects. Each domain is strongly associated with sick leave: higher workload, more conflictual student interactions, weaker managerial support, and worse general conditions all predict greater sick leave; the pain index is especially strongly related. These patterns validate that both the EFA-based and theory-driven indices capture meaningful variation in teachers' work environment.

Having established what components of work environment matter for teachers' health we now proceed to examine how student composition predicts each dimension of the work environment. Figure 5 summarizes these results based on AMU and ATS surveys and we present the full set of estimates in Appendix Tables B6 to B7. Starting with the AMU, a consistent pattern emerges. Across both the EFA-based and manually coded indices, student disadvantage is strongly associated with more conflictual or emotionally demanding interactions. There is a large and statistically significant negative association between the student index and the *Social Interactions* factor, with similar results for the *Student Interactions* index in the manual classification. These coefficients are several times larger than those for any other domain. By contrast, the associations with *Workload*, *Management*, and *General* conditions are small and statistically indistinguishable from zero. Importantly, the *Meaning* factor shows no systematic relationship with student composition, indicating that teachers in low-SES schools do not report their work as less meaningful.

[Figure 5 about here]

The ATS survey paints a closely aligned picture at the school level. Teachers in schools with more advantaged students report higher overall well-being, more peaceful classrooms, and greater

[16] We exclude an index capturing intentions to change tasks or employer for health reasons since it incorporates teachers' own assessments of their health status. Therefore it is not appropriate when analyzing determinants of sick leave.

respect from students, together with a markedly lower incidence of threats or violence. As in the AMU, teachers' sense of meaning in their work is not related to student composition. Respect from parents also shows no systematic relationship. ATS further confirms the absence of a strong workload gradient: perceived stress is not significantly related to student SES, and teachers in high-SES schools are substantially more likely to report that their classes are too large, consistent with compensatory resource allocation. A more detailed breakdown of stress sources (Appendix Table B7) suggests why overall stress does not increase in low-SES schools despite worse disciplinary climates. Stress linked to student needs and discipline is higher in low-SES schools, whereas stress tied to grading and planning is higher in high-SES schools. These opposing patterns offset each other in the aggregate, masking meaningful heterogeneity in the nature of teachers' pressures across schools.

Taken together, the AMU and ATS results point to a consistent mechanism: student disadvantage worsens teacher health primarily through qualitatively different, more conflict-ridden daily interactions rather than through heavier quantitative workloads or a work environment that is perceived to be less meaningful or supportive. Teachers in socioeconomically weaker schools face more frequent conflicts, feel less respected by students, and experience less orderly classroom environments, but quantitative demands do not appear higher in disadvantaged schools and are in some cases more pronounced in high-SES schools. These findings suggest that interventions to improve teacher well-being in low-SES schools should focus on behavioral, relational, and emotional demands rather than on reducing hours or administrative burden. It is important to note that this pattern arises in a setting where resource allocation is quite strongly weighted toward schools with greater student needs, which likely compresses differences in quantitative workload across schools.

7 Conclusions

This paper studies how student composition affects teachers' mental health and sickness absence. Using population-level administrative data and within-teacher variation across student cohorts, we show that exposure to more disadvantaged student populations substantially increases stress-related and psychiatric sickness absence among teachers. These effects are economically meaningful and persist when comparing the same teacher over time, indicating that they reflect exposure rather than selection.

More broadly, the findings contribute to a growing literature on work environments and worker health by identifying client composition as a distinct and policy-relevant source of workplace pressure. While prior research documents large workplace effects on health and burnout, it often treats pressure as a bundled job attribute that is difficult to decompose. Our setting allows us to isolate one salient component of the work environment—the characteristics of those being served—while holding constant organizational features and individual worker traits. The results show that, in contact-intensive occupations, differences in client composition can directly shape workers' mental health.

Evidence from teacher surveys points to a specific mechanism operating through the immediate work environment. The health effects are closely related to classroom conditions such as noise, discipline, and conflict-ridden interactions, rather than to general workload, organizational support, or leadership. This suggests that sustained exposure to demanding interpersonal interactions constitutes an important source of workplace pressure in contact-intensive jobs.

The results also speak to the literature on school productivity by highlighting a channel through which student disadvantage can affect educational output. Existing work shows that teacher absences and reduced instructional continuity lower student achievement, particularly for disadvan-

taged students. By demonstrating that student composition itself affects teachers' mental health and sickness absence, our findings identify a concrete mechanism linking disadvantage to school productivity: health-related disruptions to instruction, both through reduced effectiveness when teachers are present and through higher absence rates.

Finally, the paper contributes to the literature on teacher labor supply, turnover, and sorting. Prior research documents higher teacher mobility in schools serving more disadvantaged students, even in settings with limited wage flexibility. Our findings suggest that health deterioration is a plausible adjustment margin underlying these patterns. Exposure to disadvantaged student populations worsens teachers' mental health, increases sickness absence, and is associated with higher turnover and exit rates, complementing existing evidence on the role of non-pecuniary working conditions in shaping teacher labor supply.

From a policy perspective, the findings highlight a previously underappreciated cost of educational disadvantage that operates through the teacher workforce. Even if underlying student disadvantage cannot be eliminated or costlessly reallocated across schools, policies aimed at mitigating its workplace consequences—such as additional classroom support, behavioral resources, or targeted mental-health interventions—may improve teacher well-being, instructional continuity, and retention. More broadly, the results highlight worker health as an important margin through which differences in client composition affect organizational performance in contact-intensive occupations.

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Tables

Table 1: Descriptive statistics

	(1) Pooled	(2) Lower Secondary	(3) Upper Secondary
	Panel A. Characteristics of teachers		
Sick leave, any cause	87.24	94.88	76.89
	(75.20)	(81.80)	(63.80)
Sick leave, psychiatric diagnoses	31.01	33.87	27.13
	(46.34)	(50.56)	(39.60)
Sick leave, stress diagnoses	18.15	19.90	15.78
	(35.43)	(38.84)	(30.04)
Sick leave, cancer and CVD	4.90	5.03	4.72
	(17.16)	(18.46)	(15.24)
Income (SEK)	359927	350571	372582
	(75290)	(75530)	(73085)
Male	0.39	0.32	0.49
	(0.16)	(0.13)	(0.16)
Age	43.89	43.32	44.66
	(4.59)	(4.29)	(4.85)
Uncertificated	0.23	0.21	0.27
	(0.17)	(0.16)	(0.19)
	Panel B Characteristics of students and schools		
Student index	-0.12	-0.06	-0.20
	(0.30)	(0.24)	(0.35)
Share with BA+ mothers	0.27	0.29	0.24
	(0.15)	(0.15)	(0.14)
Share foreign background	0.23	0.22	0.25
	(0.21)	(0.21)	(0.20)
Average father income percentile	47.51	49.26	45.15
	(11.78)	(11.53)	(11.70)
Number of students	260.38	204.29	336.26
	(239.87)	(129.37)	(320.49)
Turnover	0.07	0.07	0.08
	(0.11)	(0.09)	(0.12)
# schools	3,797	1,946	1,851
Observations	45,534	26,180	19,354

This table presents descriptive statistics at the school level based on based on administrative data for school years 2005/06 to 2023/24. Column (1) presents pooled sample, while columns (2) and (3) separate the sample by lower-secondary and upper-secondary schools, respectively. Panel A presents means for teacher characteristics and Panel B for student characteristics. Standard deviations are in parentheses. The sick leave variables are expressed as percent per 1000 teachers. Sick leave, cancer and CVD refers to Sick leave, cardiovascular and cancer diagnoses.

Table 2: Work environment, students composition and sick leave among teachers

	(1)	(2)	(3)	(4)	(5)	(6)
	Any sick leave		Stress-related sick leave		Work environment	
Work environment	-8.830***	-4.408***	-2.837***	-2.311***		
	(1.016)	(1.598)	(0.510)	(0.863)		
Student index					0.615***	0.159**
					(0.039)	(0.074)
Mean of Y	81.83	81.83	19.56	19.56	0.01	0.01
School FE	No	Yes	No	Yes	No	Yes
# schools	2,727	2,727	2,727	2,727	2,727	2,727
Observations	10,682	10,682	10,682	10,682	10,682	10,682

This table presents results of a school-level analysis based on Swedish School Inspectorate Survey data for the academic years 2013/14 to 2023/24. The outcomes are average sick leave (columns 1 and 2), average stress-related sick leave (columns 3 and 4), and the average standardized work environment index (columns 5 and 6). All outcomes are measured at the school-by-year level. The independent variable of interest is the standardized work environment index (columns 1-4), which serves as the outcome in columns 5 and 6. All columns include year-by-school-level fixed effects, while even-numbered columns additionally include school fixed effects. Standard errors are clustered at the school level.

Table 3: Student composition and teacher sick leave: School-level analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Pooled	Lower-secondary	Upper-secondary		Pooled		Lower-secondary	Upper-secondary
				Panel A. Sick leave, any cause				
Student index	-24.943***	-25.431***	-24.635***	-20.230***	-16.664***	-13.947***	-23.500**	-12.979***
	(1.725)	(3.115)	(2.015)	(1.773)	(3.677)	(3.720)	(9.171)	(3.987)
Mean of Y	87.24	94.88	76.89	87.24	87.24	87.24	94.88	76.89
				Panel B. Sick leave, psychiatric diagnosis				
Student index	-9.934***	-8.765***	-10.673***	-8.209***	-11.459***	-10.548***	-9.297*	-11.871***
	(1.090)	(1.884)	(1.319)	(1.100)	(2.312)	(2.327)	(5.483)	(2.541)
Mean of Y	31.01	33.87	27.13	31.01	31.01	31.01	33.87	27.13
				Panel C. Sick leave, stress diagnosis				
Student index	-5.535***	-4.253***	-6.346***	-4.538***	-8.328***	-8.233***	-7.839*	-8.989***
	(0.799)	(1.380)	(0.966)	(0.814)	(1.755)	(1.757)	(4.015)	(1.936)
Mean of Y	18.15	19.90	15.78	18.15	18.15	18.15	19.90	15.78
				Panel D. Sick leave, cardiovascular and cancer diagnoses				
Student index	-0.778**	-1.082	-0.585	-0.327	0.239	0.363	-0.923	0.607
	(0.393)	(0.704)	(0.463)	(0.400)	(0.840)	(0.867)	(2.131)	(0.944)
Mean of Y	4.90	5.03	4.72	4.90	4.90	4.90	5.03	4.72
# schools	3,797	1,946	1,851	3,797	3,797	3,797	1,946	1,851
Observations	45,534	26,180	19,354	45,534	45,534	45,534	26,180	19,354
				Panel E. Teacher turnover				
Student index	-0.021***	-0.026***	-0.018***	-0.022***	-0.038***	-0.019***	-0.026***	-0.014
	(0.003)	(0.004)	(0.004)	(0.003)	(0.007)	(0.007)	(0.010)	(0.009)
Mean of Y	0.07	0.07	0.08	0.07	0.07	0.07	0.07	0.08
# schools	3,615	1,882	1,733	3,615	3,615	3,615	1,882	1,733
Observations	41,810	24,324	17,486	41,810	41,810	41,810	24,324	17,486
Controls	No	No	No	Yes	No	Yes	Yes	Yes
School FE	No	No	No	No	Yes	Yes	Yes	Yes

This table presents results of school-level analysis based on administrative data for school years 2005/06 to 2023/24. Outcomes are share of teachers on sick leave any reason (panel A), share of teachers on sick leave with psychiatric diagnosis (panel B), share of teachers on sick leave with stress-related diagnosis (panel C), and share of teacher on sick leave with cardiovascular or cancer diagnoses (panel D) and average teacher turnover (panel E). The shares are expressed as per 1000 teachers to better visualize the coefficients while turnover is defined as a fraction between 0 and 1. All columns include county-by-year-by school-level fixed effects. Columns 1 to 3 do not include any additional controls and present pooled results for all schools (column 1), results for lower-secondary schools (column 2), and results for upper-secondary schools (column 3). Columns 4 to 6 use pooled sample from column 1 but further add only control variables (column 4), only school fixed effects (column 5), and both controls and school fixed effects (column 6). Control variables include log number of students, fraction of male teachers, average teacher age and age squared, and fraction of teachers with children under age 10. Standard errors clustered at school level.

Table 4: Effects of student composition on teacher sick leave

	(1) Pooled	(2) Pooled	(3) Lower-secondary	(4) Upper-secondary
		Panel A. Sick leave, any cause		
Student index	-16.878***	-9.154***	-16.469***	-8.161***
	(1.378)	(1.835)	(3.795)	(2.287)
Mean of Y	71.28	71.28	80.75	64.33
		Panel B. Sick leave, psychiatric diagnosis		
Student index	-6.880***	-3.866***	-5.111**	-5.320***
	(0.774)	(1.188)	(2.445)	(1.414)
Mean of Y	22.77	22.77	26.36	20.14
		Panel C. Sick leave, stress diagnosis		
Student index	-4.347***	-4.221***	-5.849***	-4.982***
	(0.544)	(0.921)	(1.932)	(1.105)
Mean of Y	13.52	13.52	15.91	11.77
		Panel D. Sick leave, cardiovascular and cancer diagnoses		
Student index	0.031	0.222	-0.480	0.707
	(0.242)	(0.395)	(0.848)	(0.499)
Mean of Y	3.84	3.84	3.93	3.77
Teacher FE	No	Yes	Yes	Yes
# schools	4,032	4,032	2,029	2,000
Observations	1,079,562	1,079,562	452,668	619,223

This table presents results of teacher-level analysis based on administrative data for school years 2005/06 to 2023/24. Outcomes are an indicator for any cause sick leave (panel A), indicator for psychiatric diagnosis sick leave (panel B), indicator for stress-related diagnosis sick leave (panel C), and indicator for cariovascular or cancer related sick leave (panel D). All outcomes are scaled by 1000 teachers to better visualize the coefficients. All regressions include teacher fixed effects, county-by-year-by-school-level fixed effects as well as controls for number of students, indicator for being a male, indicator for having a child below age 10, and age fixed effects. Column 1 uses pooled sample while columns 2 and 3 split the sample into lower- (column 2) and upper- (column 3) secondary school teachers. Standard errors clustered two-way at school and teacher level.

Table 5: Robustness: Alternative explanations

	(1)	(2)	(3)	(4)	(5)	(6)
	Any sick leave		Psychiatric diagnosis sick leave		Stress-related sick leave	
Student index	-8.756***	-7.939***	-3.816***	-3.565***	-4.211***	-4.222***
	(1.890)	(1.890)	(1.218)	(1.214)	(0.953)	(0.944)
Sick leave peer effects		0.008**		0.003		0.001
		(0.004)		(0.002)		(0.002)
Regional sick leave rates for non-teachers		0.622***		0.584***		0.610***
		(0.010)		(0.013)		(0.016)
Mean of Y	71.44	71.44	22.67	22.67	13.33	13.33
# schools	3,940	3,940	3,940	3,940	3,940	3,940
Observations	1,021,196	1,021,196	1,021,196	1,021,196	1,021,196	1,021,196

This table presents results of teacher-level analysis based on administrative data for school years 2005/06 to 2023/24. Outcomes are an indicator for any cause sick leave (columns 1 and 2), indicator for psychiatric diagnosis sick leave (columns 3 and 4), and indicator for stress-related diagnosis sick leave (columns 5 and 6). All outcomes are scaled by 1,000 teachers to better visualize the coefficients. All regressions include county-by-year-by-school-level fixed effects, teacher fixed effects as well as controls for number of students, indicator for being a male, indicator for having a child below age 10, and age fixed effects. Columns 1, 3, and 5 replicate our main results based on panels A to C and column 2 of Table 4 but for the sample for which we can also measure our additional control variables. Columns 2, 4, and 6 then include controls for sick leave peer effects and regional sick leave rates. Sick leave peer effects are defined as share of teachers in a given school in a given year who are on outcome-specific sick leave leaving out the teacher in question. Regional sick leave rates are defined as share of non-teachers living in teacher's neighborhood who are on outcome-specific sick leave in a given year. Standard errors clustered two-way at school and teacher level.

Table 6: Robustness: Alternative specifications, sample choices, and treatment definitions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Econometric specifications				Treatment definition			Sample choice	
	Baseline	Spell fixed effects	Municipality-by-year fixed effects		Control for SD of student index	Grade 9 GPA anchor	Include non-SES variables	Exclude Stockholm	Exclude years 2020-2024
			School	Teacher					
	Panel A. Sick leave, any cause								
Student index	-9.154***	-7.031*	-8.694***	-9.435***	-9.163***	-11.316***	-8.602***	-9.800***	-10.481***
	(1.835)	(3.923)	(1.984)	(1.847)	(2.185)	(2.307)	(1.749)	(2.047)	(2.323)
Mean of Y	71.28	69.79	71.28	71.28	71.28	71.28	71.28	70.74	72.11
	Panel B. Sick leave, psychiatric diagnosis								
Student index	-3.866***	-7.562***	-3.830***	-4.023***	-3.991***	-4.661***	-3.431***	-5.181***	-5.032***
	(1.188)	(2.186)	(1.269)	(1.196)	(1.419)	(1.492)	(1.140)	(1.327)	(1.509)
Mean of Y	22.77	21.54	22.77	22.77	22.77	22.77	22.77	22.72	22.59
	Panel C. Sick leave, stress diagnosis								
Student index	-4.221***	-5.300***	-4.333***	-4.437***	-4.358***	-5.171***	-3.873***	-5.406***	-4.779***
	(0.921)	(1.736)	(0.982)	(0.923)	(1.119)	(1.153)	(0.891)	(1.055)	(1.188)
Mean of Y	13.52	12.85	13.52	13.52	13.52	13.52	13.52	13.55	12.80
# schools	4,032	3,782	4,032	4,032	4,032	4,032	4,032	3,220	3,595
Observations	1,079,562	1,014,348	1,079,561	1,079,526	1,079,562	1,079,562	1,079,562	869,076	793,244

This table presents results of teacher-level analysis based on administrative data for school years 2005/06 to 2023/24. Outcomes are an indicator for any cause sick leave (panel A), an indicator for psychiatric diagnosis sick leave (panel B), and an indicator for stress-related diagnosis sick leave (panel C). All outcomes are scaled by 1,000 teachers to better visualize the coefficients. Column 1 replicates results from Column 2 and panels A to C of Table 4, column 2 includes teacher-school fixed effects rather than teacher fixed effects, columns 3 and 4 replace country-by-year-by school-level fixed effects with municipality-by-year-by school-level fixed effects with school location municipality in column 3 and teacher place of residence municipality in column 4, columns 5 and 6 replicate results from column 1 while excluding Stockholm county (column 5) or 2020-2024 observation years that could be affected by Covid-19 (column 6), column 7 anchors the index in grade 9 GPA (standard deviation 0.26) rather than grade 6 (standard deviation 0.30), column 8 includes student sex, birth month and birth order in addition to indicators for foreign background, mother with university education, and average percentile of father income when creating student index (standard deviation 0.30), and finally column 9 additionally controls for standard deviation of student index. Coefficients (standard errors) on standard deviation in column 9 are -0.034 (4.214), -0.474 (2.658), and -0.521 (2.110) for panels A to C, respectively. Standard errors clustered two-way at school and teacher level.

Table 7: Effects of student composition on teacher mobility and earnings

	(1)	(2)	(3)
	Pooled	Lower-secondary	Upper-secondary
	Panel A. Probability of changing school next year		
Student index	-0.092***	-0.110***	-0.095***
	(0.006)	(0.009)	(0.009)
Mean of Y	0.11	0.09	0.12
# schools	3,924	1,966	1,954
Observations	865,608	356,139	504,508
	Panel B. Probability of not working as a teacher next year		
Student index	-0.027***	-0.037***	-0.032***
	(0.003)	(0.006)	(0.004)
Mean of Y	0.14	0.15	0.13
# schools	3,940	1,974	1,963
Observations	1,021,212	426,883	586,877
	Panel C. Ln(annual earnings)		
Student index	-0.016***	-0.017***	-0.013***
	(0.002)	(0.005)	(0.003)
Mean of Y	12.74	12.72	12.76
# schools	4,032	2,029	2,000
Observations	1,079,562	452,668	619,223
Teacher FE	Yes	Yes	Yes

This table presents results of teacher level analysis based on administrative data for school years 2005/06 to 2023/24. Outcomes are an indicator for changing school next year (panel A), indicator for not working as a teacher next year (panel B), and annual earnings (panel C). All regressions include teacher fixed effects, county-by-year-by-school-level fixed effects as well as controls for number of students, indicator for being a male, indicator for having a child below age 10, and age fixed effects. Column presents pooled results for all teachers while columns 3 and 4 split the sample into lower- (column 2) and upper- (column 3) secondary school teachers. Sample size in Panel A is smaller because this variable is missing if teacher left the profession in the next year or if the school year is 2023/2024. Sample size is smaller in Panel B because this variable is missing for school year 2023/2024. Standard errors clustered two-way at school and teacher level.

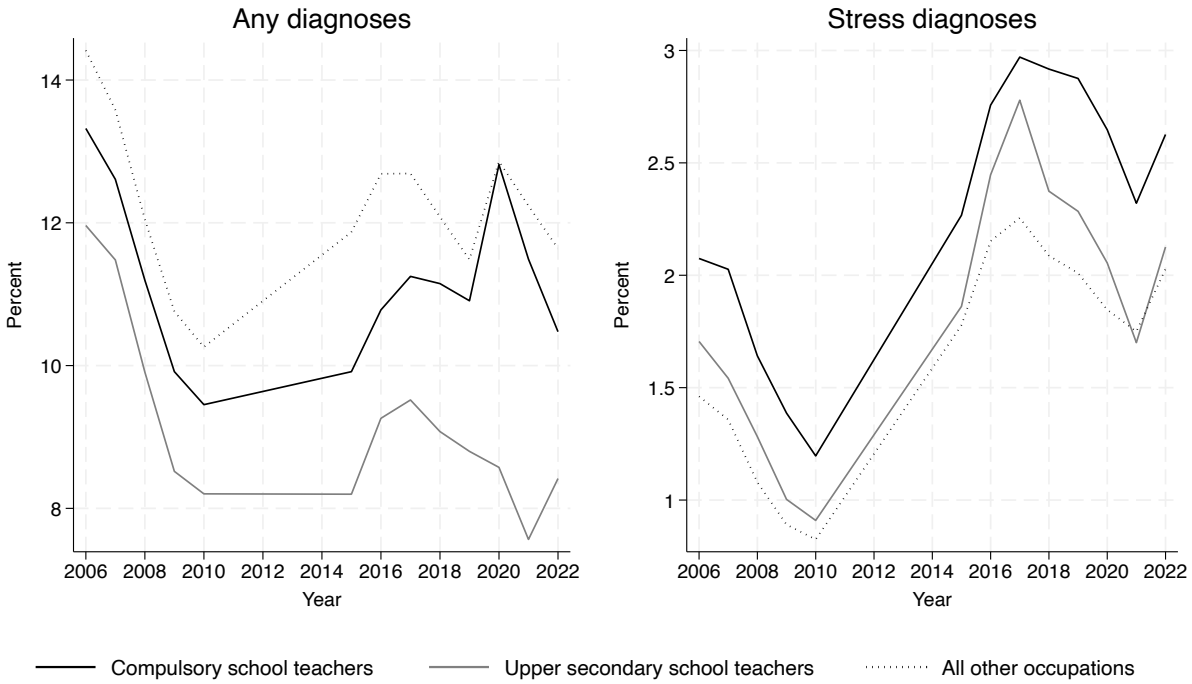
Table 8: Effects of student composition on teacher sick leave: Heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)
	Men vs. women			More (10+ years) vs. less experienced		
	Any sick leave	Psychiatric sick leave	Stress-related sick leave	Any sick leave	Psychiatric sick leave	Stress-related sick leave
Student index	-9.934***	-4.123**	-4.831***	-14.739***	-8.314***	-5.825***
	(2.498)	(1.660)	(1.325)	(2.976)	(1.993)	(1.562)
Student index * Men	1.742	0.943	1.874			
	(3.387)	(2.230)	(1.759)			
Student index * Experienced				9.426**	5.784**	1.683
				(3.859)	(2.485)	(2.004)
Mean of Y (baseline)	87.30	29.24	18.12	69.54	24.05	13.61
Mean of Y (interaction)	48.88	13.73	7.09	72.68	21.73	13.45
# schools	4,032	4,032	4,032	4,031	4,031	4,031
Observations	1,079,562	1,079,562	1,079,562	1,070,771	1,070,771	1,070,771
	(7)	(8)	(9)	(10)	(11)	(12)
	Uncertified vs. certified			Private vs. public schools		
	Any sick leave	Psychiatric sick leave	Stress-related sick leave	Any sick leave	Psychiatric sick leave	Stress-related sick leave
Student index	-8.492***	-4.344***	-4.942***	-7.979***	-3.290**	-3.786***
	(2.035)	(1.327)	(1.040)	(2.151)	(1.375)	(1.052)
Student index * Uncertified	-7.334	0.286	1.527			
	(5.330)	(3.288)	(2.622)			
Student index * Private school				-11.766**	-8.975**	-6.199*
				(5.965)	(4.000)	(3.248)
Mean of Y (baseline)	73.18	23.39	14.13	72.82	22.79	13.54
Mean of Y (interaction)	64.01	20.39	11.20	64.37	22.70	13.44
# schools	4,032	4,032	4,032	4,022	4,022	4,022
Observations	1,064,624	1,064,624	1,064,624	1,070,337	1,070,337	1,070,337

This table presents results of teacher-level analysis based on administrative data for school years 2005/06 to 2023/24. Outcomes are an indicator for any cause sick leave (columns 1, 4, 7 and 10), indicator for psychiatric diagnosis sick leave (columns 2, 5, 8 and 11), and indicator for stress-related diagnosis sick leave (columns 3, 6, 9 and 12). All outcomes are scaled by 1,000 teachers to better visualize the coefficients. All regressions include county-by-year-by-school-level fixed effects, teacher fixed effects as well as controls for number of students, indicator for being a male, indicator for having a child below age 10, and age fixed effects. Heterogeneity is illustrated through interactions and we also include interactions between the heterogeneity dimension of interest and all the control variables. Columns 1 to 3 consider differences by sex, column 4 to 6 consider differences by experience, column 7 to 9 consider differences by teacher certification, and column 10 to 12 consider differences by type of school teacher works at (private or public). Standard errors clustered two-way at school and teacher level.

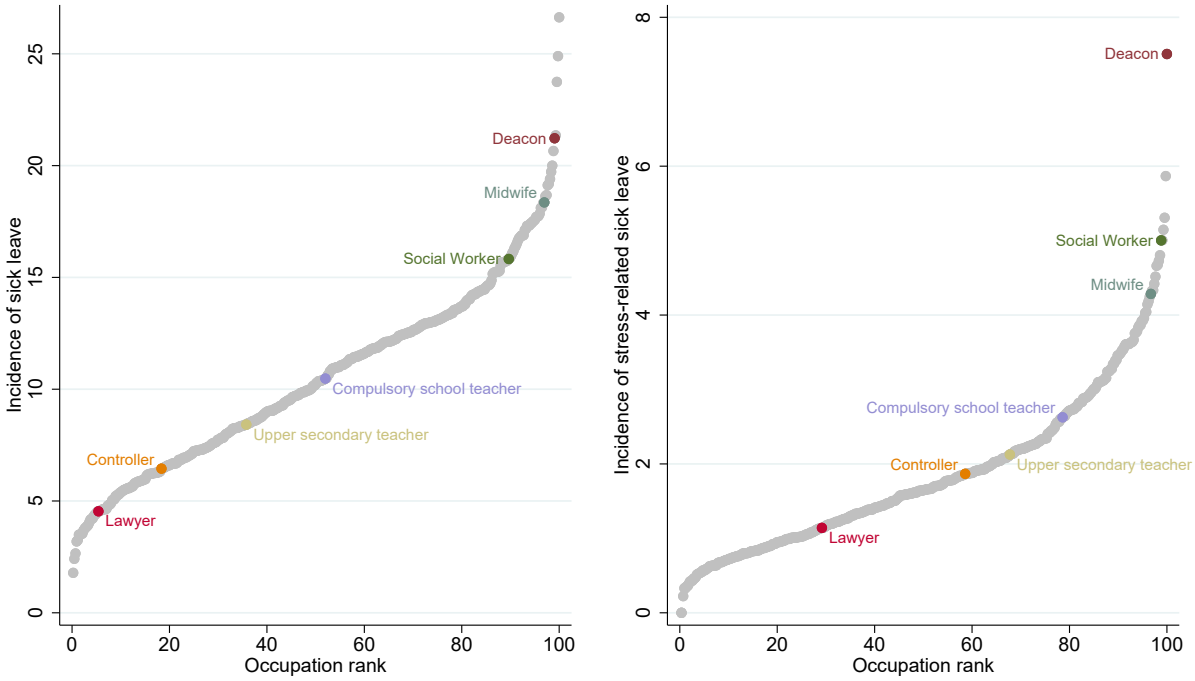
Figures

Figure 1: Trends in sick leave of teachers and other occupations



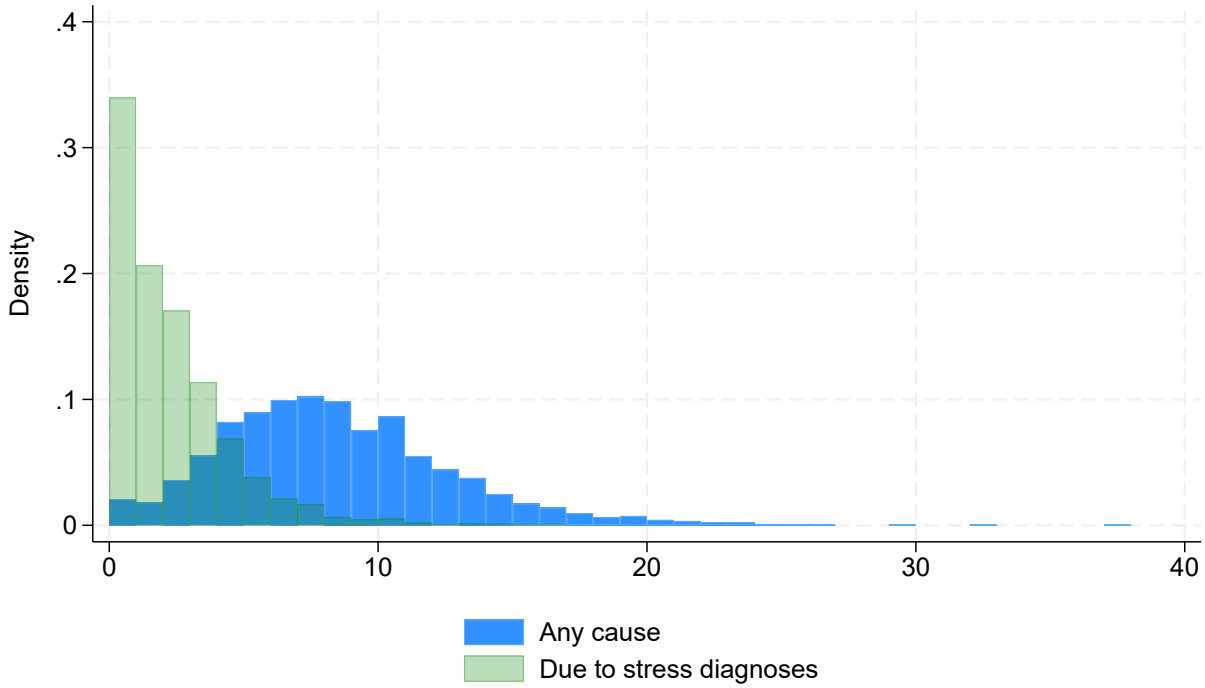
This figure plots annual level trends in sick leaves related to any diagnosis (left hand side panel) and stress-related diagnosis (right hand side panel) between 2006 and 2022. Darker solid line presents averages for compulsory school teachers, lighter solid line presents averages for upper secondary school teachers, and dotted line presents averages for all other occupations.

Figure 2: Variation in sick leave across occupations



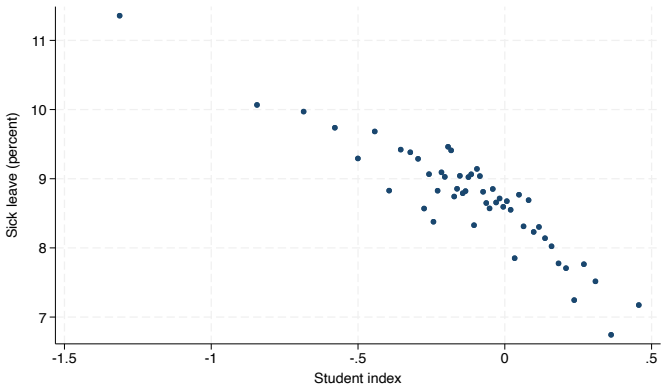
This figure plots average annual incidence of sick leave (left hand side panel) and stress-related sick leave (right hand side panel) for all occupations in Sweden. Y-axis presents the incidence while x-axis lines occupational up by their incidence. In each graph we highlight selected occupations: lawyers, controllers, upper secondary school teachers, compulsory school teachers, midwifes, social workers, and deacons.

Figure 3: Distribution of teacher sick leave across schools

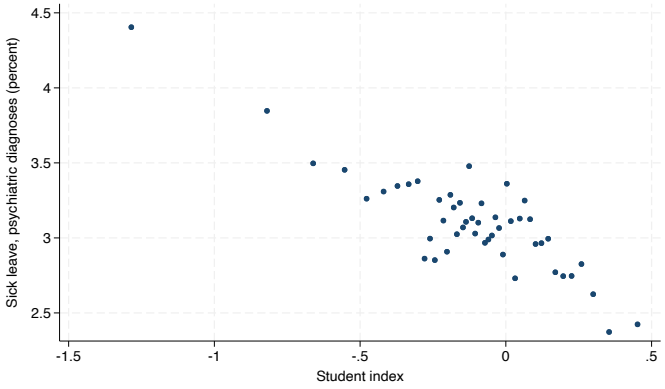


This figure presents histograms of any cause (blue bars) and stress-related (green bars) sick leaves at school level. Sick leave is measured as the average share of teachers on sick leave between school years 2015/16 to 2018/19

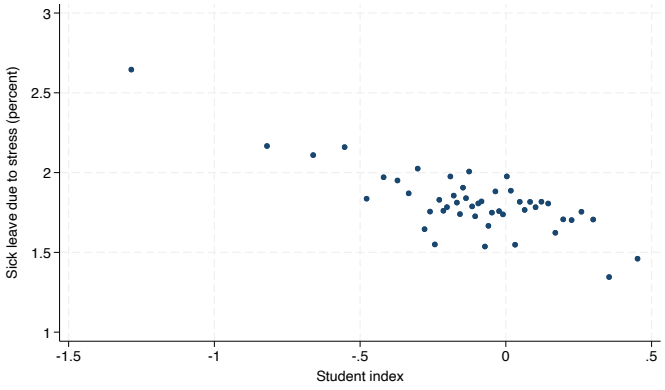
Figure 4: Student compositions and teacher outcomes: Residualized scatter plots



(a) Sick leave



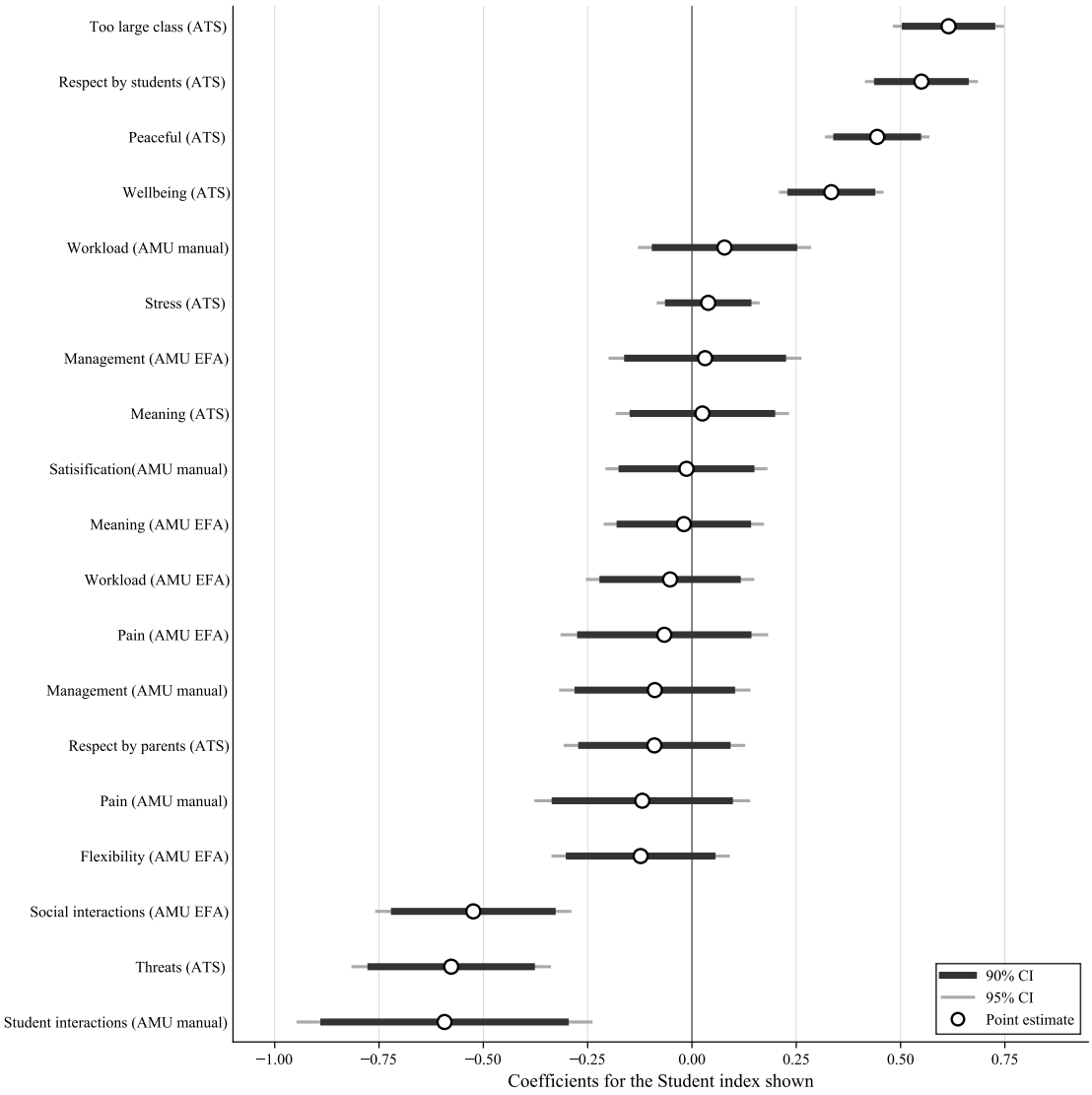
(b) Psychiatric diagnosis sick leave



(c) Stress-related sick leave

This figure displays binned scatterplots of teacher outcomes (y-axis) against the predicted student composition index (x-axis) between school years 2005/06 to 2023/24. Panel (a) shows overall sick leave, Panel (b) shows sick leave due to psychiatric diagnoses, and Panel (c) shows stress-related sick leave. The plots are constructed using the `binsreg` method. All outcomes are expressed in pp and are residualized using year-by-school-level fixed effects. To link the magnitudes discussed in the main results, note that a difference 0.1 pp corresponds to 1 teacher per 1,000

Figure 5: Plausible mechanisms



This figure presents the associations between the student index and various components of the work environment listed on the y-axis, all outcomes are standardized. Results are based on data from the Attitudes to School Teacher Survey (ATS, 2012, 2015, and 2024) and the Swedish Work Environment Survey (AMU, 2006-2022). The ATS is specific to teachers, while the AMU covers all workers; we restrict the AMU sample to teachers. Outcomes labeled as AMU manual are clusters based on the manual classification. Outcome label as AMU EFA are cluster based on the data-driven classification. All specifications control for years of experience, teacher gender, certification status, and year-by-school-level fixed effects. Standard errors are clustered at the school id.

Online Appendix (Non-For-Publication)

A Survey Data

This appendix describes the three surveys used in the analysis: the School Inspectorate's teacher survey (Skolenkäten), the Swedish Work Environment Survey (AMU), and the Attitudes to School teacher survey (ATS). For each survey, we outline its design, coverage, and the construction of the measures used in the analysis.

A.1 School Inspectorate Survey

The Swedish School Inspectorate conducts a nationwide teacher survey (Skolenkäten) each term as part of its regular oversight activities. The survey is directed to all pedagogical staff in compulsory and upper-secondary schools and covers topics related to school climate, student behaviour, support structures, collaboration, and leadership. School-level coverage is high: in a typical cycle more than 90% of schools participate, and teacher response rates are generally between 70% and 85%. The data are available only at the school level and cannot be linked to individual teachers or health outcomes.

We use the teacher survey waves fielded between 2013 and 2024. To ensure comparability across years, we restrict attention to the twelve items asked consistently in all waves: information to students and guardians, stimulation and challenge, teacher support, attention to students with special needs, critical thinking, student influence, disciplinary climate, safety, policies regarding abusive treatment, collegial collaboration, assessment practices, and pedagogical leadership. The 2022 wave omitted items related to abusive-treatment policies for a large number of schools. To maintain a balanced panel for factor analysis, we impute missing values using the nearest non-missing observation within the same school (one- or two-year lag or lead).

To summarise the structure of the teacher-reported school environment, we apply exploratory factor analysis to the twelve consistent items. We extract two factors using principal-component factor analysis, which yields a clear and interpretable structure, and rely on the rotated component solution in constructing the indices.

The eigenvalue distribution shows a sharp break after the first two components (eigenvalues 6.32 and 1.03; all remaining eigenvalues $<.93$), and the two retained factors jointly explain 61% of the total variance. After varimax rotation, the first factor loads strongly on items related to general work environment—disciplinary climate, safety, teacher support, stimulation, critical thinking, and attention to special needs. The second factor loads primarily on items related to school leadership, including collegial collaboration, assessment practices, and pedagogical leadership.

Although the Inspectorate's design aims to capture several conceptual domains, the empirical structure is highly compressed: most items load on a single broad factor describing overall school climate. We generate regression-based factor scores for the two retained factors and interpret them as school-level indices:

- **Work-environment index (factor 1)**. A broad measure of the perceived school climate.
- **Leadership index (factor 2)**. Capturing perceptions of principal leadership and organizational practices.

Because the data are already aggregated at the school level and the factor structure is stable across waves, we do not standardize the indices within wave. In the main paper, we use the work-environment index in descriptive analyses relating school climate to teacher health and student

composition, while the leadership index is used only in supplementary heterogeneity checks. These measures provide population-wide, high-frequency indicators of school climate that complement the individual-level evidence from AMU and ATS.

A.2 The Swedish Work Environment Survey (AMU)

The Swedish Work Environment Survey (Arbetsmiljöundersökningen, AMU) is a biannual survey conducted by Statistics Sweden on behalf of the Swedish Work Environment Authority. It is nationally representative of the employed population and has been fielded since 1989. The survey provides detailed information on physical and psychosocial working conditions, organizational factors, and self-reported work-related health problems. Because respondents can be linked to administrative registers, AMU enables descriptive analyses of how perceived working conditions relate to sick leave and how these correlations vary with school characteristics.

Up to and including the 2023 survey, AMU was conducted as a supplement to the Labor Force Survey (AKU), which draws a rotating panel of roughly 21,500 individuals each month. Respondents completed a short telephone module immediately after their AKU interview, followed by a more extensive postal or web questionnaire. We use AMU waves 2006–2022 and match them to register data on teachers, yielding a total of approximately 1,000–1,400 teacher observations, depending on the item.

AMU includes approximately 140–160 items per wave, covering job demands and workload (e.g. time pressure, skipped breaks, sleep and recovery), psychosocial exposures (e.g. conflicts, threats, emotionally demanding interactions), leadership and collegial support, organizational conditions, and physical strain. Because the survey is designed for the entire labor market rather than for education specifically, many individual items relate only indirectly to teachers' work environments, and single items may be noisy. To obtain coherent and interpretable measures, we classify items into broader indices.

As a first step, we use exploratory factor analysis (principal axis factoring with quartimin rotation) to identify empirical clusters of AMU items. Parallel analysis suggests retaining seven factors, and items with loadings above 0.40 are treated as belonging to the same underlying domain. Rather than using latent factor scores, which depend on extraction and rotation choices, we construct transparent indices by taking the row mean of the items associated with each factor. The resulting EFA-based indices are:

- **Workload (EFA).** Items related to time pressure, skipped breaks, difficulty unwinding, psychological demands, sleep and recovery, general fatigue, and influence over working hours.
- **Pain (EFA).** Frequency of pain in shoulders, back, hips, hands/wrists, and bodily fatigue.
- **Management (EFA).** Appreciation and support from management and colleagues, help with prioritization, assistance with difficult tasks.
- **Flexibility (EFA).** Influence over working hours, work content, breaks, flexible hours, work pace.
- **Meaning (EFA).** Monotony, stimulation, meaning, job satisfaction, reluctance to go to work.
- **Social interactions (EFA).** Conflicts, threats, and difficult contacts.
- **Health (EFA).** Considering changing tasks, employer, or duties for health reasons. This factor is mechanically related to sick-leave outcomes and is therefore not used in mechanism analyses.

Higher values on each index correspond to more demanding or negative conditions (e.g. higher workload, more pain, lower quality management, more conflict-prone social interactions). Item-level loadings are reported in Table A2.

As a complement, we construct a second set of indices based on conceptual relevance for teachers. As for the EFA-based indices, higher values implies a higher workload, more conflict-prone student interactions, lower quality management, less satisfaction and meaning, and more pain:

- **Workload (manual).** Perceived workload, overtime, dissatisfaction with work hours, presenteeism, insufficient breaks, physical strain, distractions from non-core tasks, general fatigue.
- **Student interactions (manual).** Conflicts, threats, harassment, noisy environment, appreciation from students and parents.
- **Management (manual).** Support from colleagues and management, work pace and content, flexibility of hours, workplace bullying, openness to criticism, training opportunities.
- **Satisfaction (manual).** Monotony, stimulation, sleep and rest problems, meaning, satisfaction, reluctance to work, listlessness. Higher values imply less satisfaction.
- **Pain (manual).** Pain in shoulders, back, hips, hands, eyes, and headaches.

For both sets of indices, all items are first standardized within survey year among teachers. We then compute the row mean for each index and standardize the resulting index again within year, yielding within-year standard-deviation units comparable across indices and survey waves.

A.3 Attitudes to School (ATS)

The Attitudes to School Survey (Attityder till Skolan, ATS) is administered by the Swedish National Agency for Education (Skolverket). It collects information on teachers' perceptions of their work situation, classroom climate, relations with students and parents, leadership, and sources of stress. Unlike AMU, the ATS cannot be linked to individual health outcomes, but it provides cross-sectional information on perceived work conditions at the school level.

The ATS was fielded in 2012, 2015, and 2024 and covers both compulsory and upper-secondary schools.[17] Sampling is school-based: Skolverket draws a stratified random sample of schools, and all teachers at selected schools are invited to participate. After merging with administrative school data, a total of between 1,600 and 3,400 teacher responses are available.

Data collection is conducted primarily via web questionnaires, supplemented with postal reminders. The questionnaire covers classroom environment, relations with parents, administrative burden, sources of stress, collegial support, and general job satisfaction.

Because ATS items map directly onto the mechanisms we study, we analyse them item by item rather than aggregating them into indices. We use the following items:

- **General wellbeing.** "How satisfied are you at your school?"
- **Class size.** "Do you find the class/group you usually teach too large?"
- **Discipline.** "Do you find the classroom environment to be peaceful?"
- **Respect by students.** "Are you treated with respect by students?"

[17] An additional wave was fielded in 2018, but this wave lacks usable school identifiers and is therefore excluded.

- **Respect by parents.** "Are you treated with respect by parents?"
- **Violence or threats.** "Have you been exposed to violence or threats at your school during the past year?"
- **Meaning.** "Does it feel meaningful to go to work?"
- **Stress.** "How often do you feel stressed at school?"

The stress module also includes questions about stressors: lesson planning, special-needs students, administrative work, documentation, grading, parent interactions, lack of influence or support, shortages of substitute teachers, and the disciplinary climate, although these sub-items vary somewhat across waves.

To ensure comparability across survey waves and alignment with the AMU analysis, we standardize each ATS item to have mean zero and standard deviation of one within survey year. This removes level shifts caused by changes in question wording or response scales and places all items on a common metric.

Table A1: The Swedish School Inspectorate Survey Factor Loadings

(1) Variable	(2) Factor Loadings	(3)
	Work Enviroment	Leadership
Teacher awarenessinformation of educational deman	0.42	0.42
Teacher practices of challenging/stimulating instruct	0.64	0.34
Teacher support and adjustments to student needs	0.75	0.42
School support for students with special needs	0.68	0.48
Teacher encouragement of critical thinking	0.73	0.22
Teacher view of student influence and participation	0.58	0.38
Teacher perception of school discipline	0.68	0.00
Teacher perception of safe school environment	0.83	0.27
School policies and teacher practices against abuse	0.67	0.41
Pedagogical collaboration among teachers	0.15	0.85
Routines for grading and assessment	0.42	0.75
Pedagogical leadership	0.25	0.76

This table presents the detailed factor loadings used in the construction of the work environment and leadership index. Column (1) reports the variables used. Columns (2) and (3) report the factor loadings of the two factors obtained using principal-component factor analysis.

Table A2: The AMU Survey Factor Loadings

(1) Factor	(2) Variable labels	(3) Loadings
Workload (EFA)	Do you skip lunches or breaks?	0.78
	There is no time to chat with colleagues during work	0.71
	Is your workload too high?	0.81
	Do you have a high workload?	0.7
	Do you find it difficult to stop thinking about work?	0.74
	Do you feel despair because of work difficulties?	0.41
	Do you feel inadequate for job?	0.55
	Is your job psychologically demanding?	0.5
	Do you lack time or energy for family and friends?	0.66
	Do you rarely get enough sleep	0.51
	Do you have difficulties sleeping?	0.51
	Do you rarely get enough rest apart from sleep?	0.63
	Do you have influence over working hours (higher=less)	0.4
Pain (EFA)	Do you often feel pain in shoulders and arms?	0.91
	Do you often feel pain in hands or wrists?	0.77
	Do you often feel pain in hips or legs?	0.73
	Do you often feel pain in lower back?	0.78
	Do you often feel pain in upper back?	0.88
	Do you often feel physical fatigue after a workday	0.58
Management (EFA)	Do you feel unappreciated by your boss?	0.48
	Do you feel a lack of appreciation and support from colleagues?	0.45
	Do you feel unsupported by your boss?	0.84
	Does your boss help you prioritize your tasks? (higher=less)	0.71
	Do you receive help with difficult tasks when needed? (higher=less)	0.62
Flexibility (EFA)	There is no time to take breaks and chat	0.6
	Do you lack influence over work content	0.58
	Do you lack flexible hours	0.55
	Do you perceive a lack of freedom in work	0.44
	Can decide work pace (higher=less)	0.55
Meaning (EFA)	Do you find your job monotonous?	0.49
	Do you find your job stimulating? (higher=less)	0.45
	Do you find your job meaningful? (higher=less)	0.48
	Are you satisfied your job? (higher=less)	0.51
	Do you despair because of work difficulties?	0.55
	Are you reluctant to go to work	0.67
Social Interactions (EFA)	Does your job involve contact with people who have personal or human problems?	0.41
	Have you experienced threats of violence at work?	0.46
	Do you experience conflicts with others at work?	0.62
	Do you experience conflicts with your boss?	0.41

This table presents the detailed factor loadings used in the construction of the AMU survey. Column (1) reports the factors extracted from the exploratory factor analysis, using a loading cutoff of 0.4. Column (2) lists the questions used to construct each factor. Column (3) reports the loadings of each factor.

B Additional Results

This appendix presents additional tables and figures that supplement the main analysis, including robustness checks, index components and survey regression tables.

Table B1: Associations between teacher sick leave and student composition: School-level analyses weighted by number of teachers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Pooled	Lower-secondary	Upper-secondary		Pooled		Lower-secondary	Upper-secondary
				Panel A. Sick leave, any cause				
Student index	-23.644***	-22.424***	-24.167***	-19.118***	-17.484***	-14.280***	-22.953***	-13.657***
	(1.600)	(3.038)	(1.877)	(1.603)	(3.422)	(3.411)	(8.243)	(3.747)
Mean of Y	85.44	94.87	78.42	85.44	85.44	85.44	94.87	78.42
				Panel B. Sick leave, psychiatric diagnosis				
Student index	-9.098***	-8.219***	-9.474***	-7.575***	-11.008***	-9.696***	-12.291**	-9.782***
	(0.983)	(1.745)	(1.189)	(0.976)	(2.095)	(2.114)	(4.879)	(2.357)
Mean of Y	29.32	33.44	26.25	29.32	29.32	29.32	33.44	26.25
				Panel C. Sick leave, stress diagnosis				
Student index	-5.169***	-4.288***	-5.547***	-4.379***	-7.070***	-6.603***	-10.308***	-6.227***
	(0.689)	(1.294)	(0.813)	(0.691)	(1.528)	(1.540)	(3.525)	(1.711)
Mean of Y	16.93	19.62	14.94	16.93	16.93	16.93	19.62	14.94
				Panel D. Sick leave, cardiovascular and cancer diagnoses				
Student index	-0.514	-0.210	-0.645	-0.025	0.400	0.582	-0.310	0.694
	(0.369)	(0.637)	(0.451)	(0.371)	(0.751)	(0.773)	(2.024)	(0.833)
Mean of Y	5.17	5.27	5.10	5.17	5.17	5.17	5.27	5.10
# schools	3,797	1,946	1,851	3,797	3,797	3,797	1,946	1,851
Observations	45,534	26,180	19,354	45,534	45,534	45,534	26,180	19,354
				Panel E. Teacher turnover				
Student index	-0.022***	-0.023***	-0.021***	-0.019***	-0.041***	-0.023***	-0.025***	-0.020**
	(0.003)	(0.003)	(0.004)	(0.003)	(0.008)	(0.008)	(0.008)	(0.009)
Mean of Y	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
# schools	3,615	1,882	1,733	3,615	3,615	3,615	1,882	1,733
Observations	41,810	24,324	17,486	41,810	41,810	41,810	24,324	17,486
Controls	No	No	No	Yes	No	Yes	No	Yes
School FE	No	No	No	No	Yes	Yes	Yes	Yes

This table replicates results from Table 3 but weights the observations by number of teachers in a given school and year. Standard errors clustered at school level.

Table B2: Correlation between the three SES index components

	(1)	(2)	(3)	(4)
	Student index	Share of students with foreign background	Share of student whose mothers have college education	Average income percentile of students' fathers
Student index	1			
Share of students with foreign background	-0.679	1		
Share of student whose mothers have college education	0.748	-0.264	1	
Average income percentile of students' fathers	0.922	-0.694	0.672	1

This table presents correlation coefficients between student index as well as the three components used to construct the student index.

Table B3: Effects of student composition on teacher sick leave: SES index components

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Any sick leave		Psychiatric diagnosis sick leave		Stress-related sick leave		Cancer and cardiovascular diagnoses sick leave	
	Included separately	Included jointly	Included separately	Included jointly	Included separately	Included jointly	Included separately	Included jointly
Share of students with foreign background	14.460***	14.235***	6.297***	7.952***	5.957***	3.822	-0.166	-0.665
	(2.901)	(4.851)	(1.862)	(2.984)	(1.462)	(2.371)	(0.649)	(1.092)
Share of students with BA+ mothers	-27.073***	-28.235***	-9.933***	-10.871***	-9.512***	-6.809**	0.093	0.451
	(4.230)	(5.859)	(2.689)	(3.572)	(2.099)	(2.828)	(0.926)	(1.287)
Average paternal income percentile	-0.231***	0.183*	-0.086***	0.107*	-0.104***	0.001	-0.001	-0.013
	(0.049)	(0.099)	(0.031)	(0.060)	(0.024)	(0.047)	(0.011)	(0.022)
Mean of Y	71.28	71.28	22.77	22.77	13.52	13.52	3.84	3.84
# schools	4,032	4,032	4,032	4,032	4,032	4,032	4,032	4,032
Observations	1,079,562	1,079,562	1,079,562	1,079,562	1,079,562	1,079,562	1,079,562	1,079,562

This table replicates results from panels A to C in column 2 of Table 4 but instead of using composite student index as explanatory variable of interest it considers specific components of the index. These are either included separately (column 1, 3, and 5) or jointly (columns 2, 4, and 6). This means that each of the former columns presents coefficients from three different regressions while each of the latter columns presents coefficients from a single regression. Outcomes are an indicator for any cause sick leave (columns 1 and 2), indicator for psychiatric diagnosis sick leave (columns 3 and 4), and indicator for stress-related diagnosis sick leave (columns 5 and 6). All outcomes are divided by 1000 to better visualize the coefficients. Standard errors clustered two-way at school and teacher level.

Table B4: Robustness: Investigating reverse causality

	(1)	(2)	(3)
	Students index at time t+1		
Any sick leave at time t	-0.001*		
	(0.000)		
Pychiatric diagnosis sick leave at time t		-0.000	
		(0.001)	
Stress-related sick leave at time t			-0.000
			(0.001)
Mean of Y	-0.11	-0.11	-0.11
# schools	3,839	3,839	3,839
Observations	996,219	996,219	996,219

This table presents results of teacher-level analysis based on administrative data for school years 2005/06 to 2023/24. Outcome variable in each of the three regressions (column 1 to 3) is student index at time t+1 which is regressed on time t sick leave (displayed coefficients) as well as time t student index and other control variables defined in our preferred specification. All regressions include county-by-year-by-school-level fixed effects, teacher fixed effects as well as controls for number of students, indicator for being a male, indicator for having a child below age 10, and age fixed effects. Standard errors clustered two-way at school and teacher level.

Table B5: Effects of student composition on teachers work environment factors from AMU survey

	(1)	(2)	(3)	(4)	(5)			
	Workload	Student interactions	Pain	Management	Satisfaction			
	Panel A. AMU Estimates: Manual Classfication							
Student index	0.078	-0.593**	-0.119	-0.089	-0.013			
	(0.106)	(0.180)	(0.132)	(0.117)	(0.099)			
# schools	998	739	737	739	998			
Observations	1,400	975	973	975	1,398			
	(6)	(7)	(8)	(9)	(10)	(11)		
	Workload	Management	Social interactions	Pain	Flexibility	Meaning		
	Panel B. AMU Estimates: Data-Driven Classfication							
Student index	-0.052	0.032	-0.524***	-0.066	-0.123	-0.019		
	(0.103)	(0.118)	(0.120)	(0.127)	(0.109)	(0.098)		
# schools	998	738	739	737	739	998		
Observations	1,396	972	973	972	974	1,396		
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
	Wellbeing	Too large class	Peaceful	Respect by students	Respect by parents	Threats	Meaning	Stress
	Panel C. ATS Estimates							
Student index	0.334***	0.615***	0.444***	0.550***	-0.090	-0.577***	0.025	0.039
	(0.064)	(0.068)	(0.064)	(0.069)	(0.111)	(0.122)	(0.106)	(0.063)
# schools	1,843	1,843	1,843	1,847	1,035	1,058	1,057	1,845
Observations	3,441	3,431	3,438	3,443	1,532	1,582	1,581	3,443

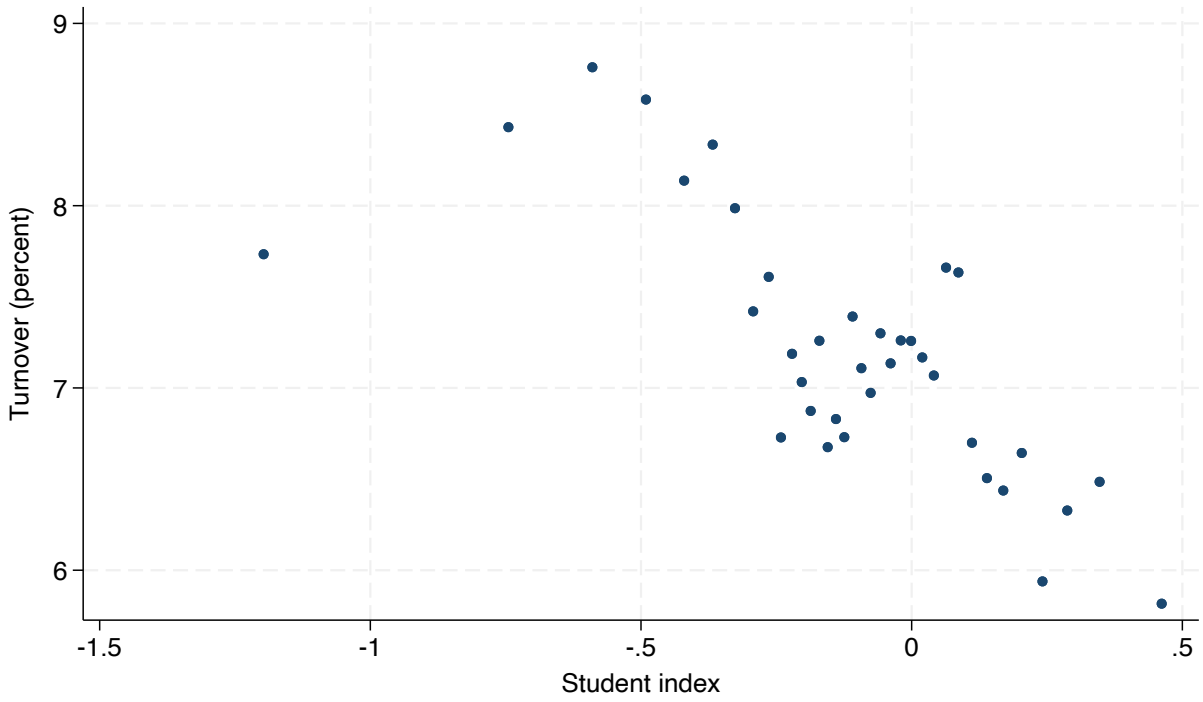
Higher values implies worse conditions: higher workload, lower quality student and social interactions, more pain, worse management lower satisfaction. and lower flexibilities. All regressions control for age, sex, certification status, and year-by-school level fixed effects. Standard errors clustered by school in parenthesis

Table B6: Effects of work environment factors on teacher sick leave

	(1) Sick Leave, any cause	(2) Sick leave, psychiatric diagnosis	(3) Sick leave, stress diagnosis	(4) Observations
		Panel A. Manual Classification		
Workload	27.2**	23.6***	16.8***	1,400
	(8.5)	(5.5)	(4.7)	
Student interactions	26.4*	19.4*	14.6*	975
	(10.9)	(7.8)	(5.8)	
Pain	49.7***	22.1**	16.8**	973
	(12.2)	(8.2)	(6.4)	
Management	34.0**	23.8**	15.1*	975
	(11.2)	(8.0)	(6.2)	
Satisfaction	28.2**	19.2***	14.4**	1,398
	(9.0)	(5.8)	(4.8)	
		Panel B. Data-Driven Classification (EFA)		
Workload	36.0***	22.8***	15.0***	1,396
	(9.3)	(5.6)	(4.0)	
Management	19.2*	12.4**	9.4*	972
	(10.9)	(6.3)	(4.8)	
Social interactions	34.1***	22.8***	17.7***	973
	(11.5)	(7.3)	(6.7)	
Pain	53.2***	9.5	10.9**	972
	(12.0)	(6.2)	(5.1)	
Flexibility	30.8***	13.5***	5.8	974
	(10.7)	(5.1)	(3.9)	
Meaning	22.9***	10.8**	10.1**	1,396
	(8.8)	(5.4)	(4.5)	

Note: Teacher stress from AMU survey. Year 2006, 2008, 2010, 2012, 2014,2016, 2018, 2020, 2022 All specifications control for gender age certification status, and year-by-school form fixed effects. Standard errors clustered by school id.

Figure B1: Associations between student composition and teacher turnover: Residualized scatterplot



This figure presents scatterplot of teacher turnover on y-axis against the predicted index of student composition on x-axis based on the binreg command. Control variables include county-by-year fixed effects, average age of teachers at the school, fraction of male teachers at the school, and fraction of teachers with children under 10 at the school.

Table B7: Effects of student composition on teacher stress

	(1) General	(2) Planning	(3) Student needs	(4) Admin	(5) Documentation	(6) Grading
Student index	0.035	0.070**	-0.131***	0.039	0.004	0.143***
	(0.060)	(0.030)	(0.032)	(0.031)	(0.053)	(0.049)
Mean of Y	3.65	0.66	0.63	0.68	0.69	0.50
# of schools	1,845	1,823	1,823	1,823	1,042	1,042
Observations	3,443	3,387	3,387	3,387	1,550	1,550
	(7) Meetings	(8) Parents	(9) Influence	(10) Support	(11) Substitutes	(12) Discipline
Student index	-0.017	0.041	-0.037	-0.060*	0.005	-0.118***
	(0.034)	(0.029)	(0.025)	(0.033)	(0.034)	(0.032)
Mean of Y	0.44	0.22	0.10	0.20	0.23	0.20
# schools	1,823	1,510	1,148	1,148	1,148	1,148
Observations	3,387	2,543	1,837	1,837	1,837	1,837

Note: This table presents results of teacher-level analysis on different reasons for teacher stress based on National Board of Education Survey (ATS) using years 2012, 2015, 2024. All specifications control for years of experience, teacher sex, certification status, and year-by-school-level fixed effects. Standard errors clustered at school level.