



# What Happened to the K-12 Education Labor Market During COVID? The Acute Need for Better Data Systems

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The COVID-19 pandemic upended the U.S. education system and the economy in ways that dramatically affected the jobs of K-12 educators. However, data limitations have led to considerable uncertainty and conflicting reports about the nature of staffing challenges in schools. We draw on education employment data from the Bureau of Labor Statistics (BLS) and State Education Agencies (SEA) to describe patterns in K-12 education employment and to highlight the limitations of available data. Data from the BLS suggest overall employment in the K-12 labor market declined by 9.3 percent at the onset of the pandemic and remains well below pre-pandemic levels. SEA data suggest that teachers have not (yet) left the profession in mass as many predicted, but that turnover decreased in the summer of 2020. We explore possible explanations for these patterns including (1) weak hiring through the summer of 2020 and (2) high attrition among K-12 instructional support staff. State vacancy data also suggest that schools are facing substantial challenges filling open positions during the 2021-22 academic year. Our analyses illustrate the imperative to build more timely, detailed, and nationally representative data systems on the K-12 education labor market to better inform policy.

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## What Happened to the K-12 Education Labor Market During COVID? The Acute Need for Better Data Systems

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### Abstract

The COVID-19 pandemic upended the U.S. education system and the economy in ways that dramatically affected the jobs of K-12 educators. However, data limitations have led to considerable uncertainty and conflicting reports about the nature of staffing challenges in schools. We draw on education employment data from the Bureau of Labor Statistics (BLS) and State Education Agencies (SEA) to describe patterns in K-12 education employment and to highlight the limitations of available data. Data from the BLS suggest overall employment in the K-12 labor market declined by 9.3 percent at the onset of the pandemic and remains well below pre-pandemic levels. SEA data suggest that teachers have not (yet) left the profession in mass as many predicted, but that turnover decreased in the summer of 2020. We explore possible explanations for these patterns including (1) weak hiring through the summer of 2020 and (2) high attrition among K-12 instructional support staff. State vacancy data also suggest that schools are facing substantial challenges filling open positions during the 2021-22 academic year. Our analyses illustrate the imperative to build more timely, detailed, and nationally representative data systems on the K-12 education labor market to better inform policy.

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## Introduction

In the spring of 2020, the COVID-19 pandemic swept across the country, shuttering schools and shifting classes online. This rapid change introduced major new operating costs for schools in the form of facilities upgrades, new supplies required for operating schools safely, and new technology for supporting remote instruction. Districts were forced to rethink staffing roles and make employment decisions with considerable uncertainty about the future outlook of education funding. Initial fears led to sobering predictions about huge budget shortfalls in state and local funding for public education, with projections of job losses that would exceed the Great Recession and linger for many years (Griffith 2020; Page 2020).

In addition to the immediate financial consequences, the pandemic also altered teachers' work dramatically, exposing them to potential health risks, increasing their workloads, and inducing considerable stress (Diliberti, Schwartz, and Grant 2021; Diliberti and Kaufman 2020; Kraft, Simon, and Lyon 2021). Policymakers, administrators, and pundits all warned of a massive exodus from the teaching profession (French 2020; Griffith 2020; Page 2020) – with teachers expressing serious concerns about the lack of childcare, low pay relative to the increased job stress and health risks, and the transition to online learning (Diliberti, Schwartz, and Grant 2021). By the end of the 2019-20 school year, one in three teachers reported they were likely to leave their job (EdWeek Research Center 2020). Still, there remains considerable debate about what happened to the education labor market during the COVID-19 pandemic.

Much of the debate stems from a lack of data on the U.S. K-12 labor market that is 1) nationally representative, 2) detailed, and 3) timely. Here, we endeavor to leverage a range of available national and state datasets while simultaneously highlighting the limitations of each data source. Data from the U.S. Bureau of Labor Statistics (BLS) describes national employment trends and is updated monthly. However, the BLS data offers only limited information on K-12

teachers and may not accurately measure employment for educators during the unique transition to virtual schooling. Additionally, contemporaneous BLS data are often revised many months after the release of preliminary estimates and can conflate trends in higher education and private schools with the K-12 public education sector. The National Center for Education Statistics (NCES) collects more detailed and nationally representative data that would be useful for examining changes in the K-12 education labor market. Unfortunately, post-pandemic employment data from NCES will not be available for years, well past its usefulness for policymakers. Thus, we turn to data from selected State Education Agencies (SEA), which provide more detailed employment data. The challenge here is that SEAs' disparate and sometimes opaque approaches to reporting these data offer an incomplete view into the national education labor market.

In this brief, we draw on the best education employment data available from the BLS and SEAs to inform our understanding of the past, present, and future of the education workforce in the wake of the COVID-19 pandemic. We document patterns over time from 2000 to 2021 while highlighting specific changes in the labor market from March 2020 to October 2021 – the period from the start of the COVID-19 pandemic through the most recent available data. Our exploratory analyses serve to illustrate the unprecedented changes in the K-12 education labor market during the COVID-19 pandemic. We find that the K-12 education labor market shrank by about 9.3 percent from March to May 2020. Employment in September 2021 remained 3.7 percent below pre-pandemic levels in March 2020. At the outset of the pandemic, more K-12 instructional support staff appear to have left their positions than teachers during the same period in previous years.

## **Educator Labor Market Data**

The inadequacy of teacher labor data has led to contradictory and sometimes inaccurate conclusions about the effects the pandemic on the teacher labor market. Teachers did not leave their jobs in mass in the summer of 2020 as many people feared. At the same time, teaching vacancies do appear to have increased substantially starting in the summer of 2020 compared to the years before the pandemic in part due to weak hiring. More recent surveys conducted by RAND in 2021 and the National Education Association in 2022 find that teachers continue to report high rates of burnout and potential intentions to leave the profession (Zamarro et al. 2021; Jotkoff 2022). However, data on actual teacher departures in the summer of 2021 remain sparse causing policymakers and journalists to rely on anecdotal cases on social media and incomplete data from sources such as LinkedIn (Dill 2022). We have limited data for turnover rates in 2021 where much remains to be known. This lack of high-quality data makes it difficult to study the teacher labor market, and K-12 education jobs more broadly, at a time when this information is critically important for policymakers.

To explore changes in the educator labor market during the pandemic, we use three surveys from the BLS: the Current Employment Statistics (CES), the Job Openings and Labor Turnover Survey (JOLTS), and the Current Population Survey (CPS). Each BLS survey captures similar but not fully overlapping populations of education employees given distinct sampling targets and survey designs. Table 1 provides a quick summary of the unit and population captured by each BLS survey. The CES surveys approximately 144,000 businesses and government organizations including school districts each month. These data allow us to estimate the number of primary and secondary jobs in the U.S. K-12 public education sector. The JOLTS surveys roughly 16,000 public and private sector organizations on job openings, hires, and

separations each month. These data provide insight into the circumstances under which education employees left their positions. We observe the number of job separations for state and local government education employees, which includes K-12 school districts and higher education institutions, but excludes private schools.

An important limitation of the CES and JOLTS data is that they do not allow researchers to disaggregate estimates for specific occupations within the K-12 education sector using publicly available data (e.g., classroom teachers, instructional support staff). At the national level, we turn to the CPS data that allow for a more detailed view into employment trends for U.S. K-12 public- and private-sector workers. CPS provides more granular occupation information that allows us to estimate separate employment trends for teachers and other instructional and school support staff. However, we describe only broad trends using the CPS data given survey design issues that may have uniquely influenced the K-12 education sector during the initial transition to virtual schooling (See Appendix B for a detailed discussion of this issue).

Finally, we draw on SEA data to examine teacher turnover and hiring trends using all publicly available data reported by states.<sup>1</sup> We began by inspecting the employment data from states that publish teacher hiring data and then focused on a subset that also provide teacher turnover data (Saenz-Armstrong 2021). We identified 14 states that provide estimates of teacher turnover for pre-pandemic years and at least the first year of the pandemic, the 2019-20 school year (See Appendix Table C.1 for full details). Differences in turnover definitions and data reporting approaches across states present substantial challenges and make it difficult to compare

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<sup>1</sup> See Appendix Table C.1 for state definitions of teacher turnover.

patterns across states.<sup>2</sup> We define teacher turnover as the percent of employed public teachers in the base school year that do not return (however defined) in the subsequent school year. For example, the turnover rate for 2018-19 is the percent of teachers in 2018-19 that did not return to the school (or districts in some cases) they taught in during the 2019-20 school year. Despite these limitations, data from SEAs does provide important insights about how turnover has changed within individual states over time.

## Findings

### How Many K-12 Education Jobs Were Lost During the COVID-19 Pandemic?

The CES provides timely national data on primary and secondary education employment. As shown in Figure 1, the K-12 public education labor market grew steadily over the first decade of the 21<sup>st</sup> century, rising from 7.2 million employees to over 8.1 million at its height in 2008. Education employment then declined steadily from 2009 to 2012 in the wake of the Great Recession and has never fully recovered. The total number of primary and secondary education employees began to increase slowly starting in 2014, reaching about 8 million employees before the start of the pandemic.

Figure 1 also illustrates the sudden and steep decline in employment in the K-12 public education sector with the onset of the COVID-19 pandemic. Between March and May 2020, K-12 public education employment decreased by about 9.3 percent. The rapid decline in jobs at the beginning of the COVID-19 recession was unprecedented in its magnitude, more than twice the

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<sup>2</sup> For example, some states do not count inter-district moves in their measures of teacher turnover whereas others calculate retention measures that are agnostic to the type of career transition (See Appendix Table C-1 for more details). States also measure turnover at different times during the school year (e.g., October 2020 to October 2021). Even the years (previous vs. current) that are used to label a similar estimate of turnover are inconsistent across states. We standardize state definitions of teacher turnover to the degree that is possible. All remaining differences in definitions are described in Appendix Table C-1.

number of jobs during the four-year contraction following the Great Recession. This steep decline erased 20 years of labor market expansion in the span of two months. In the months since, total employment has been volatile given high levels of uncertainty as the pandemic persists but appears to be recovering to some degree.

### **Which Type of K-12 Education Jobs were Hardest Hit?**

The lack of timely employment data for teachers and instructional support staff limits our capacity to understand how the COVID-19 pandemic influenced employment for specific education occupations. Overall, the CPS data show that immediate job losses were relatively larger among school support staff, with meaningful declines among teachers as well.<sup>3</sup> Additionally, job losses and subsequent recovery in instructional support staff varied widely across occupations. This general pattern of results is consistent with a recent analysis of CPS data (Cooper and Hickey 2022) and with occupation specific data from Colorado and Illinois (Colorado Department of Education 2021; Illinois State Board of Education 2021). At the end of the 2020-21 school year, there were 3 percent fewer office and administrative support staff, 5 percent fewer people in crafts, trades, and services, and 4 percent fewer paraprofessionals compared to the 2018-19 school year. In Illinois, there were 1 percent fewer nurses and 6 percent fewer guidance counselors in the in 2019-20 school year compared the previous school year.

### **Were Predictions of Unprecedented Turnover True?**

The BLS data do not allow us to observe K-12 teacher turnover information. Data reported by SEAs suggest that the high rates of teacher turnover that many feared have not yet materialized in practice. Figure 2 displays average teacher turnover across 14 states for the two

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<sup>3</sup> We find that estimates of total employment in specific education occupations vary considerably from month to month in the CPS limiting researchers' ability to make precise inferences about employment changes in specific occupational sectors.



school years prior to the pandemic and the post-pandemic school year 2019-20. We encourage readers to focus on the relative changes over time shown in Figure 2 rather than absolute levels given the SEA data limitations described above. We find clear and consistent evidence that there was no increase in teacher turnover after the start of the pandemic. In fact, we estimate that turnover declined by 1.1 percentage points, on average, in the summer of 2020 across the 14 states that publicly report data (See Figure 2 Panel A).<sup>4</sup>

The relatively stable rate of turnover during the 2019-20 school year is likely a consequence of economic insecurity caused by the pandemic. Research shows that teachers are less likely to leave their jobs during a recession (Nagler, Piopiunik, and West 2020; Goldhaber and Theobald 2021). The turnover patterns shown in Figure 2 are also consistent with results from a national survey of school districts (Diliberti and Schwartz 2021) and an analysis of individual level data from six large schools districts (Rosenberg and Anderson 2021). Additionally, recent research indicates that teacher intentions to transfer schools or leaving the profession is an imperfect proxy for actual rates of teacher turnover (Nguyen et al. 2022). This finding helps to explain why survey results that forecasted an exodus from classrooms did not come to pass.

Big questions still remain about whether turnover increased in the 2020-21 school year as the economy recovered and new COVID-19 variants continued to make work in schools challenging. Turnover data for the 2020-2021 school year is currently available from only two states, South Carolina and Washington. We display these data in Figure 2 Panel B, which suggest that there has not been a large spike in teacher turnover even in the second year of the pandemic. However, we discourage readers from drawing strong conclusions about turnover in the 2020-21

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<sup>4</sup> This difference in average teacher turnover in 2018-2019 and 2019-20 is not statistically significant.

school year because the data are (1) available in only two states and (2) South Carolina includes departures for teachers and other service positions (e.g., guidance counselors, school psychologists). Increasing rates of teacher turnover remain a distinct possibility as the COVID-19 pandemic persists, making efforts to standardize and expand data collection efforts even more pressing.

### **Why Did Jobs Decline?**

We turn to the JOLTS data to explore possible explanations for the large decline in overall K-12 education employment given that teacher turnover has been relatively stable through 2021. Data suggest this decline is explained by a range of factors including weak hiring at the start of the pandemic and an increase in total separations (i.e., retirements, layoffs, quits). The decline in hiring is clearly evident in Figure 3, which plots the total number of separations and hires in the public education sectors (i.e., primary, secondary, postsecondary). Hiring plummeted at the start of the COVID-19 pandemic. Schools and universities hired an average of 32,000 fewer educators per month in the six months after the pandemic relative to the average over the 5 prior years. Federal stimulus aid supported ephemeral hiring booms in January and June 2021, but they were not large enough to offset months of anemic hiring. JOLTS data also show that total separations of employees from K-12 public schools and public colleges/universities also reached an all-time high during the COVID-19 pandemic. At their peak in March 2020, the number of total separations (294,000) was roughly double the steady rate observed across the prior two decades.

The rise in total separations in the JOLTS data raises a puzzle. How did total separations (i.e., quits, layoffs, retirements,) reach historically high levels in the JOLTS if teacher turnover has remained relatively stable? One possible answer is that these separations are largely driven

by job losses in the higher education sector. A major weakness of the JOLTS is that estimates aggregate K-12 and post-secondary workers together, posing a challenge because of the differences in how schools and universities responded to the COVID-19 pandemic. Universities laid off large numbers of support staff as buildings emptied and classes shifted online (Douglas-Gabriel and Fowers 2020). University revenues are projected to decline by \$17 billion to \$30 billion over the period from 2020 to 2025 (Kelchen, Ritter, and Webber 2021). Additionally, 20 percent of universities responded to the pandemic by not renewing or terminating contracts for at least some non-tenure track faculty (American Association of University Professors 2021). A second possible explanation, consistent with patterns in the CPS, is that job reductions in K-12 education were primarily driven by school and district staff rather than classroom teachers.

### **Continued Staffing Challenges in the Wake of COVID**

Districts across the country are still struggling to fill open teaching, instructional support, and service positions (Heyward 2021; Goldhaber and Gratz 2021). In September 2021, at the beginning of the 2021-22 school year, 80 percent of schools reported having at least one full or part-time teacher vacancy, and 38 percent of schools reported having more total staff vacancies than in previous years (National Center for Education Statistics 2021). Teacher vacancies have risen appreciably in the fall of 2021 in 18 of 20 large U.S. school districts (Barnum 2021). State hiring data show that the proportion of newly hired teachers declined 0.6 percentage points in 2019-20 and 1.9 percentage points in 2020-21 compared to the three school years prior to the pandemic (i.e., Colorado, South Carolina, Texas)(Colorado Department of Education 2021; Smith 2021; Center for Educator Recruitment, Retention, & Advancement 2021).

### **Conclusion**

At the outset of the pandemic, school leaders were acutely concerned about a repeat of the Great Recession, when the housing market collapse led to a prolonged drop in public education funding and a substantial decline in the education sector workforce. We find that the initial shock of the COVID-19 pandemic caused an unprecedented decrease in the size of the U.S. K-12 public education labor force, but that this historic decline in the K-12 labor force was not driven by increased teacher turnover. We read the state hiring/vacancy data in conjunction with the JOLTS data to support two potential explanations: a massive slowdown in hiring coupled with increased separations (e.g., quits, layoffs, retirements,) concentrated among instructional support staff.

Our analyses suggest that the data collection infrastructure in the U.S. is largely inadequate for providing detailed, real-time information about national trends in the K-12 teacher workforce. This lack of nationally-representative, detailed, and timely data substantially limits the information policymakers have when attempting to make data-informed decisions during crises such as the COVID-19 pandemic. Our lack of a national teacher labor market data system leads to conflicting and potentially erroneous conclusions about the current state of the teacher labor market. The federal government should renew efforts to require states and/or districts to report turnover statistics for teachers and other education employees using a standardized definition. This will require building state/district longitudinal data systems and strengthening the capacity of analysts in education agencies across the country to provide these statistics. The National Center for Education Statistics, which currently collects and shares critical education data (e.g., school finance, high school graduation), should be at the center of efforts to disseminate national teacher turnover data on a timely basis to policymakers.

The future trajectory of the K-12 teacher labor market remains an open question. Previous recessions had both immediate and delayed effects on education employment (Kraft and Bleiberg 2021). The Education Department has advised states to spend Elementary and Secondary School Emergency Relief funds by 2024 (U.S. Education Department 2021), creating a potentially large fiscal cliff for states and districts (National Conference of State Legislators 2021). Concerns about teacher stress and burnout remain and employee separations appear to be on the rise again. Vaccine hesitancy and new COVID-19 variants could unexpectedly cause further school closures and tip the economy back into a recession. We expect that the COVID-19 recession and prolonged pandemic will continue to shape both prospective employees' decisions whether to pursue a career in K-12 education and current education employees' decisions whether to remain in the profession.

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Table 1. BLS Labor Definitions

Survey	Unit	K-12 Public School	K-12 Private School	Post-Secondary Education
CES	Businesses/Organizations	X		
JOLTS	Businesses/Organizations	X		X
CPS	Households	X	X	

*Note:* Current Employment Survey=CES; Job Openings and Labor Turnover Survey=JOLTS; Current Population Survey=CPS

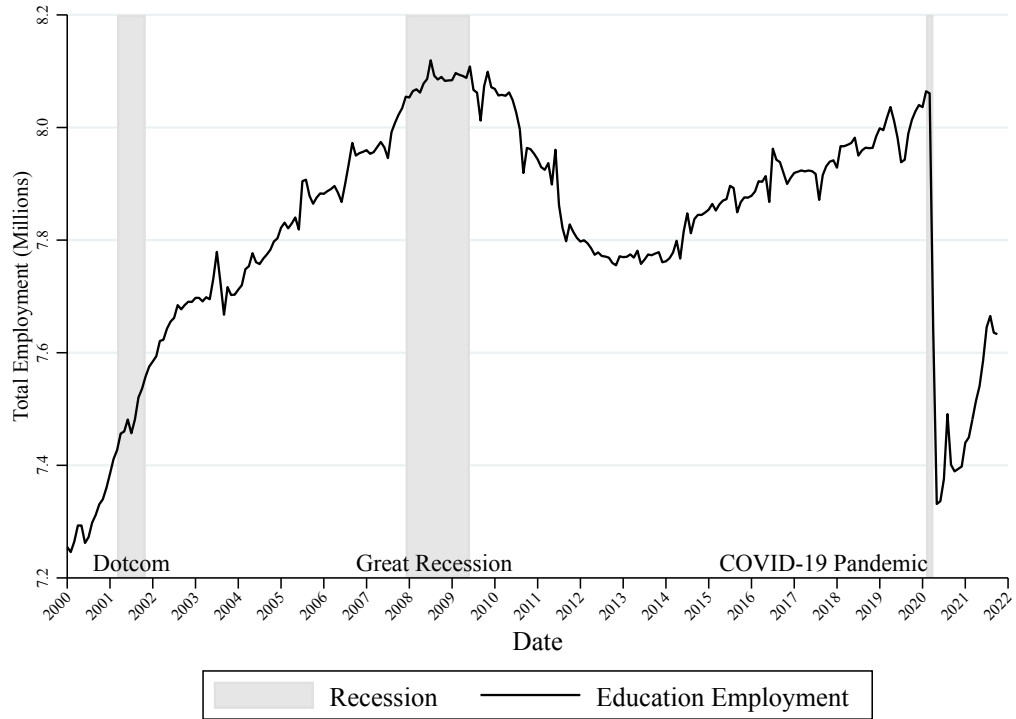


Figure 1. Total employment in U.S. local government education industry  
 Notes: Adapted from Gould (2020). Estimates are seasonally adjusted.  
 Source: U.S. Bureau of Labor Statistics, Current Employment Statistics.

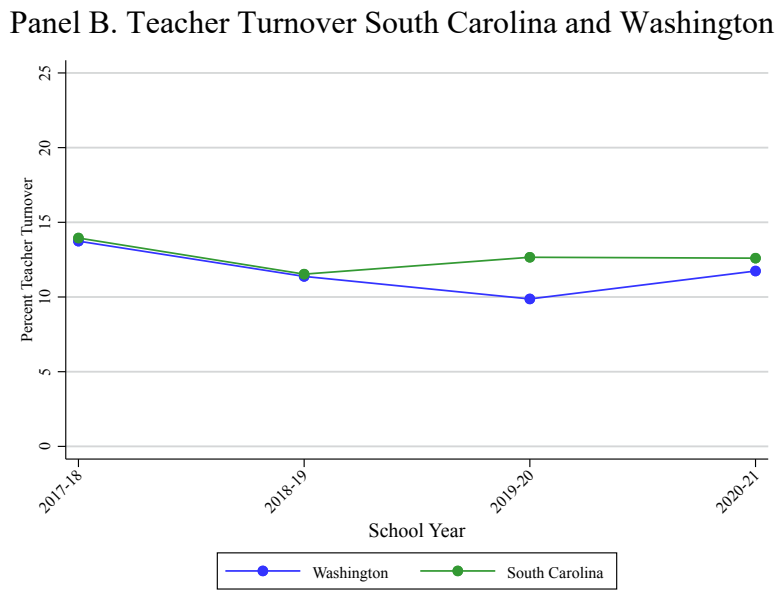
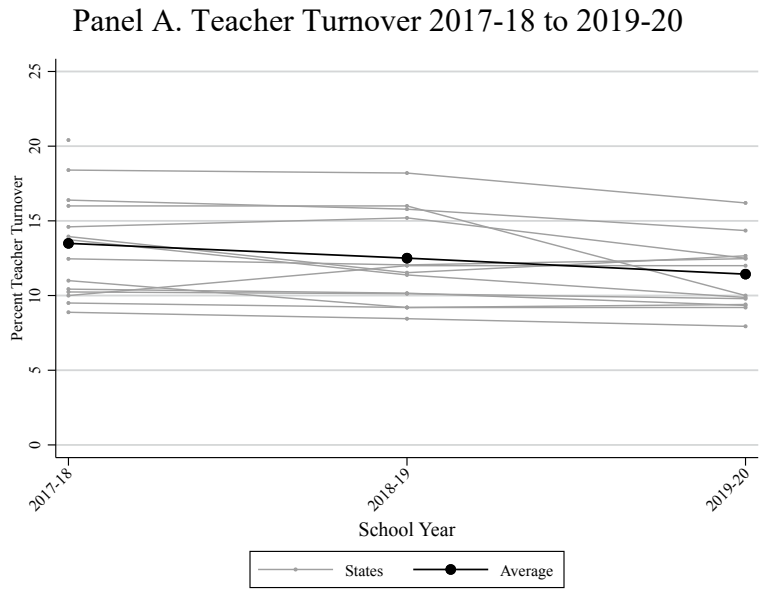


Figure 2. State teacher turnover across time

Note: Percent teacher turnover is the percent of employed public teachers in the base school year that do not return (however defined) in the subsequent school year. Percent teacher turnover is averaged across 14 states. Grey lines represent teacher turnover for each of the 14 states and the black line represents the national average.

Source: See Appendix C-1 for source information.

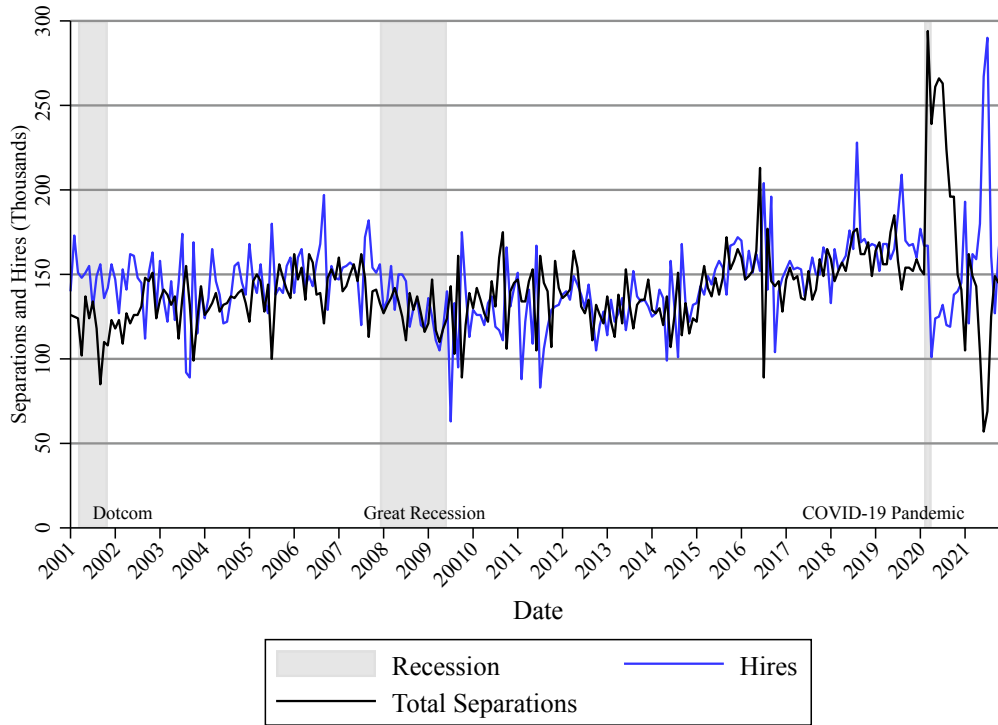


Figure 3. State and local government education separations and hires

Note: Estimates are seasonally adjusted.

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

## **Appendix A. Data Sources and Definitions**

This appendix describes the differences in how various Bureau of Labor Statistics surveys define occupation.

### *Current Employment Statistics (CES)*

CES surveys approximately 144,000 businesses and government agencies each month about employment, hours, and earnings (Bureau of Labor Statistics 2021a). We observe the number of seasonally adjusted local government education employees from January 2000 to September 2021. This includes all employees of school districts and excludes private schools and higher education institutions.

### *Job Openings and Labor Turnover Survey (JOLTS)*

JOLTS surveys about 16,000 public and private sector organizations on job openings, hires, and separations each month (Bureau of Labor Statistics 2021c). We observe the seasonally adjusted number of state and local government education employees separated from the payroll for the months from January 2001 to October 2021. State and local government education employees include employees of school districts and higher education institutions, but excludes private schools. We observe three types of separations: quits, layoffs, and retirements. See Appendix Table A.1 below for detailed definitions of separations.

**Appendix Table A.1. JOLTS Separation Definitions**

<u>Separation Type</u>	<u>Definition</u>
Quits	Employees who left voluntarily, excluding retirements or transfers to other locations.
Layoffs & Firings	Involuntary separations initiated by the employer, including: layoffs with no intent to rehire; discharges because positions were eliminated; discharges resulting from mergers, downsizing, or plant closings; firings or other discharges for cause; terminations of seasonal employees (whether or not they are expected to return next season); layoffs (suspensions from pay status) lasting or expected to last more than 7 days. (If the employee was later recalled, they should be reported as a hire at the time of recall.)
Retirements	Retirements; transfers to other locations; deaths; or separations due to employee disability

Note: The JOLTS data include the category “other separations”. We use the term retirements, which describes the preponderance of separations in this group.

Source: JOLTS Data Definitions (Bureau of Labor Statistics 2021b)



## **Appendix B. Basic Monthly Current Population Survey**

We also conducted a series of analyses using the Basic Monthly Current Population Survey (CPS). The CPS surveys approximately 60,000 households each month on a range of topics including employment and occupation. The CPS data allow for a detailed view into employment trends for U.S. K-12 public- and private-sector workers. The primary advantage of the CPS data is that it allows us to estimate employment trends for granular education occupations (e.g., elementary school teachers, school bus drivers, school psychologists).

Unfortunately, the pandemic created unique challenges for interpreting the CPS data. At the outset of the pandemic, schools temporarily stopped instruction to develop online education environments (American Enterprise Institute and College Crisis Initiative 2021). It is likely that BLS erroneously determined many education employees were unemployed during the first few months of the pandemic. The BLS survey protocols consider workers to be unemployed if they are not working, even if they are being paid (Bureau of Labor Statistics 2021a; 2021d). Additionally, BLS estimates from the past year are revised as a regular practice. The additional uncertainty created by the pandemic increases the likelihood of a substantial revision (Bureau of Labor Statistics 2021e; Van Dam 2021). Finally, the CPS sampling design does not support valid inferences for individual occupations and measurement error likely accounts for month-to-month fluctuations in relatively smaller education occupations (e.g., school bus monitor).

## Appendix Table B.1. CPS Educator Occupation Definitions

### Core Classroom Teachers

Years	Occupation
2000 to 2021	Preschool and kindergarten teachers
2000 to 2021	Elementary and middle school teachers
2000 to 2021	Secondary school teachers
2000 to 2021	Special education teachers

### Instructional and School Support Staff

Years	Occupation
2000 to 2002	Counselors, Educational and Vocational
2000 to 2002	Early childhood teacher's assistant
2000 to 2021	Teachers' aides/assistants
2003 to 2021	Other teachers and instructors
2020 to 2021	Tutors
2020 to 2021	School bus monitors
2020 to 2021	Bus drivers, school
2020 to 2021	School psychologists
2020 to 2021	Child, family, and school social workers

Note: Other teachers and instructors combines: adult basic education, adult secondary education, and English as a second language instructors; self-enrichment teachers; substitute teachers, short-term; all other teachers and instructors. Several occupations in the education sector were excluded including: library technicians; other educational instruction and library workers; postsecondary teachers, archivists, curators, museum technicians, and librarians.

**Appendix Table C.1. State Teacher Turnover Definitions and Sources**

State	Type	Definition	Sources
CO	Leaves School	The proportion of certified educators who in the subsequent school year left the position they held in the base school year to the number of certified teaching positions in public school districts in the base school year.	Colorado Department of Education (2021) contains the number of teachers who are "people who left" and the "head count of teachers" in "Personnel Turnover Rate by District and Position Categories. See "Previous School Years" for prior years of data.
DE	Leaves School	The proportion of educators who remained in the same school in the following year to the educators who remained in the same school in the base school year.	Delaware (2021) reports the Same School Retention rate, the within district transfer rate, between district transfer rate, and the "turnover" rate, which describes teachers who left Georgia school entirely.
GA	Leaves School	The proportion of teachers present in their respective roles in the fall of the base school year and the fall of the subsequent school year.	Georgia (Pelfrey and Flamini 2020) reports the proportion of retained teachers. The annual reports contain the proportion retained for each year.
ID	Leaves School	The proportion of teachers in the base year that returned to their position in the subsequent school year.	Idaho (State of Idaho 2021) reports the proportion of retained teachers in a web application.
KY	Leaves School	The proportion of teachers that left teaching in a school, district or the state.	Kentucky Department of Education (2021) reports "The proportion of teachers that left teaching in a school, district or the state." by year. Data 2017-18 are available in the archive.
LA	Leaves School	The proportion of the teacher workforce exiting the classroom. Includes teachers who were retiring, transferring to another Louisiana school system, or leaving due to personal reasons.	Louisiana (2020) reports the percent of teacher workforce exiting from classroom.
MA	Leaves School	The proportion of teachers who worked in the same school from one year to the next.	Massachusetts (Massachusetts Department Of Elementary And Secondary Education 2021) reports the "roll-up" estimates for schools or the proportion of teachers who don't work in the same

			school. Reports for individual school years are available.
MI	Leaves School	The proportion of “moving” teachers (i.e., the teacher building assignment changes between the base school year and subsequent school year) and “leavers” (i.e., the teacher has a building assignment code in the base school year t and no building assignment code in the subsequent school year) to the total number of public-school teachers in the base school year.	The number of movers and leavers is found in Figures 3.7 and 3.8 (Education Policy Innovation Collaborative 2021) and number of employed teachers in MDE (Michigan Department of Education 2021, 33).
NC	Leaves District	The proportion of teacher who leave their district (i.e., reduction in staffing due to move out of state, retirement) in the base school year and the mobility rate (transfers to another LEA within the state).	North Carolina Department of Public Instruction (2021) reports the attrition and mobility rates annually in reports.
SC	Leaves District	The proportion of teachers who were not reported as employed by district in the subsequent school year regardless of reason for leaving to the number of teaching positions in the base school year.	South Carolina Center for Educator Recruitment, Retention, & Advancement (2021) contains the number of teacher departures and links to the Annual Educator Supply and Demand Reports. Table 1A in each report includes the total number of certified teachers.
SD	Leaves District	The proportion of instructional staff that are no longer employed by a district at the end of a school year to the total teacher Full Time Equivalents in the state in that school year.	Departures are available by year in the South Dakota Department of Education Instructional Staff Turnover and Vacancy dashboard (South Dakota Department of Education 2021a) and the number of teaching positions are available under "Districts & Statewide Profiles, Staff Information - FTE, By Reporting Type" for the school years from 2014-15 to 2020-21 (South Dakota Department of Education 2021b).
TX	Leaves District	The proportion of teachers who were reported as not employed by any LEA in subsequent school year but were reported as employed in the base school year to total number of teachers in the state in the base school year.	The number of "attriting" teachers and teachers overall from Texas Education Agency (Smith 2021).

TN	Leaves District	The proportion of educators in the base year who returned to the district as of 10/1 in the subsequent year.	Tennessee Education Research Alliance (Patrick et al. 2021) estimates teacher retention.
WA	Leaves District	The proportion of teachers present in their school districts in the fall of the base school year and the fall of the subsequent school year.	Calculated by authors using SAFS files from the years 2017 through 2022. Code available upon request (Washington Office of Superintendent of Public Instruction 2022).

Notes: We define teacher turnover as the percent of employed public teachers in the base school year that do not return (however defined) in the subsequent school year. For example, the turnover rate for 2018-19 is the number of employees in 2018-19 that did not return to their schools in 2019-20 divided by the number of teachers employed in 2018-19. Type describes whether a state's turnover measure include teachers who left their district or their school. Definition describes state definitions of teacher turnover. Source describes where teacher turnover information is stored and how it was constructed.