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Retirement patterns of California prekindergarten–grade 12 educators

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February 2012

Prepared by

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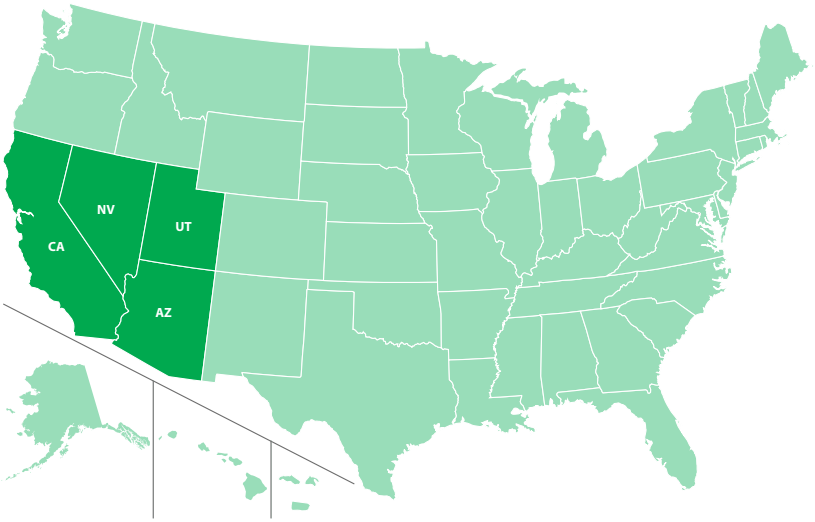

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February 2012

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Summary

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Retirement patterns of California prekindergarten–grade 12 educators

This study examines retirement patterns of California educators from 1995/96 to 2009/10. It finds that the percentage of educators over age 60 doubled, educators were more likely to retire when a school district's local revenue decreased, and the percentage of retired educators returning to work increased.

Education leaders in California have expressed growing interest in learning whether and how the recent economic recession and the aging of the baby boomer population, whose first wave has reached peak retirement ages, have affected California educators' age distribution and retirement rates.

Four research questions covering the period 1995/96–2009/10 guided this study:

- How has the age distribution of preK–12 certificated educators changed?
- How have the retirement rates of preK–12 certificated educators for each age in the peak retirement age range of 58–64 changed?
- How have individual retirement decisions varied across districts with different levels of per student state and local revenue and across counties with different unemployment rates?
- How has the proportion of preK–12 retirees employed in the California public school system after retirement changed?

This study examined the retirement patterns of California educators using three datasets. Data for 1995/96–2009/10 were obtained by special request from the California State Teachers' Retirement System (CalSTRS), the state's defined benefit retirement program. All full-time certificated employees (such as teachers, school nurses, speech therapists, and school administrators) of noncharter California public schools and school districts are automatically members of CalSTRS, and certificated employees of charter schools and certificated part-time staff may elect to participate. The CalSTRS data showed, for each year and age, the number of current members, retiring members, and members who had previously retired but worked during that year in the California public school system.

In addition, annual district-level financial data were collected from the California Department of Education (2011), and annual county-level unemployment rates in California over 1995–2010 were retrieved from the California Employment Development Department (2011).

Study findings revealed that:

- The age span of California educators widened from 1995/96 to 2009/10 as the ages of the state's oldest educators rose.
- In 1995/96, the statewide age distribution had a single peak, with educators clustered at approximately age 49; in 2009/10, the statewide age distribution had two peaks, clustered around ages 39 and 60.
- Retirement rates among those ages 61–64 were on an upward trend from 2005/06 to 2009/10.
- Among educators ages 58–64, retirement rates were higher in 1995/96, 2003/04, and 2009/10 than in other years.
- On average, a $1,000 reduction in a district's "other local revenue" per student was associated with approximately a 4 percent higher probability of educators retiring.
- Over the study period, the percentage of retired California educators working in the state's public school system after retirement increased steadily, from approximately 3 percent of retirees in 1995/96 to more than 11 percent in 2007/08–2009/10.

February 2012

TABLE OF CONTENTS

This study examines retirement patterns of California educators from 1995/96 to 2009/10. It finds that the percentage of educators over age 60 doubled, educators were more likely to retire when a school district's local revenue decreased, and the percentage of retired educators returning to work increased.

WHY THIS STUDY?

National and state education policymakers and researchers are concerned about how anticipated retirements among baby boomer educators in public school systems will affect their ability to meet workforce needs (Carroll and Foster 2008; Dillon 2007). For example, Ellis et al. (2008) suggested that more than half the K–12 teaching force in Massachusetts in 2006/07 would need to be replaced over the next decade because of expected retirements. California faces a similar challenge. More than a quarter of the state's certificated educators (see box 1 on key terms) were ages 51–60 in 2007/08, suggesting an impending wave of retirements as these educators move into their 60s (White and Fong 2008; White, Fong, and Makkonen 2010).

Some studies have suggested that eligible workers have been responding to the recent economic and financial crisis and recession by delaying retirement (Gustman, Steinmeier, and Tabatabai 2009; Hurd and Rohwedder 2010; Shapiro 2010). However, these studies have tended to examine all workers. Trends in the retirement decisionmaking of public sector workers who participate in defined benefit programs, such as California's educators, have not been well studied (Friedberg 2011). This study focuses on the retirement patterns of California's certificated educators since 1995/96, looking at the issue from several perspectives, including shifts in the age distribution, variations in retirement rates, factors that could influence retirement timing, and variations in the rates of postretirement employment in the California school system.

Membership in the California State Teachers' Retirement System and the decision to retire

From the first day of employment, all full-time certificated employees of noncharter California public schools and school districts are members of the state's defined benefit retirement program, the California State Teachers' Retirement System (CalSTRS).[1] As with other defined benefit plans,

BOX 1

Key terms

Certificated staff. Employees in positions requiring certification for employment. Such employees include teachers, school nurses, speech therapists, and school-site administrators.

Classified staff. Employees in positions not requiring certification. Such employees include teaching assistants, library aides, school secretaries, custodians, bus drivers, and cafeteria workers.

District revenue. The sum of three types of district revenue that together comprise all state and local revenue received by districts. The *revenue limit* is the amount districts receive for general purposes and is typically a combination of local property taxes and state funds. *Other state revenue* and *other local revenue* include the rest of the revenue received by districts from state and local sources.

Logistic regression. A statistical analysis that can be used with binary (yes/no) outcome variables. The analysis estimates the statistical relationship between the binary outcome variable and the independent variables studied.

Odds ratio. The ratio of the odds of an event occurring for one group to the odds of the same event occurring for another group. For instance, the odds ratio of graduating from high school can be calculated for students enrolled in program A and those in program B. An odds ratio greater than 1 indicates that the odds of graduating are higher for program A than for program B.

Pooled, cross-sectional data. A dataset that combines multiple years of data. Each year of data may or may not contain the same individuals or entities. Pooled, cross-sectional data can be contrasted with longitudinal data, which track the same individuals over time using an identification number to identify each individual in each time period.

participants in CalSTRS are promised benefits based on their age, years of service, and salary. Their benefits are protected and must be paid regardless of what happens to the pension fund assets. Essentially, the state bears the market risk. This differs from defined contribution plans, such as 401(k)s, which are established and often subsidized by employers but are owned and controlled by employees, who bear the risk of market declines.

Participants in defined benefit retirement plans often have a financial incentive to retire "on time" within their systems (Costrell and Podgursky 2009; Friedberg 2011; Munnell, Muldoon, and Sass 2009). Although details vary by state, teachers' defined benefit systems often generate spikes in retirements related to "enhancements to the benefit formula at specified ages or (years of service)" (Costrell and Podgursky 2009, p. 193). Once teachers reach the specified age or years of service (usually the early 60s), pension wealth accrual commonly shifts in a negative direction (that is, future annual pension payments no longer compensate for the amount of pension collection forgone).[2] In places with such pension benefit plans, there is a built-in disincentive to continue working beyond the "on-time" retirement age. As a result, Harris and Adams (2007) suggest, at the national level, teachers are more likely than nurses, social workers, or accountants to retire before age 65.

CalSTRS members are eligible to retire at age 50 if they have at least 30 years of service or at age 55 if they have at least 5 years of service, but the system offers financial incentives for working longer. Annual retirement benefits are calculated as a member's final compensation, multiplied by the number of years of credited service and then by a benefit factor, which increases with age but is capped at 2.4 percent. Thus, the marginal value of working diminishes after certain key age benchmarks (California State Teachers' Retirement System 2011a).[3] Since at least 1989, the average retirement age of CalSTRS members has been around age 61 (California State Teachers' Retirement System 1999, 2010).[4]

Other factors can influence retirement decisions, such as a decline in spousal income (Blau 1998; Hurd and Rohwedder 2010). A school district's budget climate can also influence retirement decisions of school staff. In recent years, some

California districts have adopted early retirement incentives. An informal review of news stories and data on early retirement benefits conducted for this study found that more than 150 California school districts offered some early retirement benefit to employees in 2009/10. For example, in 2009 the Los Angeles Unified School District offered district employees who were at least age 50 with 30 years of service or age 55 with 5 years of service 40 percent of their 2009/10 salary spread over five years or longer on top of their normal pension as an early retirement incentive. As of the end of April 2009, nearly 1,400 teachers, counselors, and administrators had accepted the offer (Llanos 2009). Although gathering detailed data on other early retirement offerings from districts across the state is beyond the scope of this study, it is evident that districts' state and local revenue per student tend to correlate strongly with the state's broader economic climate (Taylor 2011a). Whether districts' state and local revenue per student are associated with educators' retirement decisions is a knowledge gap this study seeks to address.

In addition to examining the retirement patterns of California's educators, this study explores educators' postretirement employment decisions, looking at the proportion of preK–12 educators who return to work in the California public school system after retiring and at how this proportion has changed over the past 15 years.[5] Although these retirees are subject to an annual earnings limit (set at $31,020 for 2010/11), there are exemptions. For example, earnings limits do not apply to any work done by retirees after 12 consecutive months of retirement. Other exemptions address particular workforce needs. For example, CalSTRS retirees are exempt from earnings limits if they return to work in special education or English language learner programs (California Education Code §24216.5[a][2][E-F], amended in 2004), to provide direct remedial instruction to students before or after school or during the summer (California Education Code §24216.6[a][2], amended in 2000), or to train teachers or paraprofessionals in an internship or alternative certification program (California Education Code §24216.5[a][2][D], amended in 2007).[6] To date, little research has explored postretirement employment trends among California educators over time.

The results of this study may help interested groups prepare for future fluctuations in educator retirements as more educators reach peak retirement ages and as the economy affects their retirement decisions

Beyond work by White and Fong (2008) and White, Fong, and Makkonen (2010), few recent studies have focused on retirements among CalSTRS members. California has clearly been affected by the current recession, with unemployment rates reaching 12 percent and a state budget deficit of $25.4 billion in 2010 (Taylor 2010). In this context of severe recession and the general aging of California's education workforce (Bland et al. 2010), the leaders of the Integrated Leadership Development Initiative (a collaboration of the California Commission on Teacher Credentialing, the Association for California School Administrators, researchers, the California Comprehensive Center, and county office representatives) expressed interest in learning more about recent variations in California educators' age distribution and retirement rates. In addition, CalSTRS senior management is interested in better understanding factors associated with retirement. The results of this study may help these groups prepare for future fluctuations in educator retirements as more educators reach peak retirement ages and as the economy affects their retirement decisions.

Research questions

Four research questions covering the period 1995/96–2009/10 guided this study:

- How has the age distribution of preK–12 certificated educators changed?
- How have the retirement rates of preK–12 certificated educators for each age in the peak retirement age range of 58–64 changed?[7]
- How have individual retirement decisions varied across districts with different levels of

per student state and local revenue and across counties with different unemployment rates?

- How has the proportion of preK–12 retirees employed in the California public school system after retirement changed?

To answer these questions, this study used quantitative data from three sources: CalSTRS (obtained by special request), the California Department of Education (California Department of Education 2011), and the California Employment Development Department (California Employment Development Department 2011). Box 2 and appendix A describe the data sources and study methodology.

STUDY FINDINGS

The proportion of California educators older than age 60 more than doubled over the study period, from 5.5 percent in 1995/96 to 14.2 percent in 2009/10. This age shift has budget implications for school districts because of the positive relationship between educators' ages and salaries. In addition, a $1,000 reduction in a district's "other local revenue" per student was, on average, associated with approximately a 4 percent higher probability of educators retiring. Finally, the proportion of retired educators working in the California public school system has increased steadily over the past 15 years, from approximately 3 percent in 1995/96 to more than 11 percent in 2007/08–2009/10.

Changes in the age distribution of preK–12 certificated educators

The age span of California educators has widened in recent years, largely because the ages of the state's oldest educators (those in the 75th and 90th percentiles of the statewide age distribution) have

BOX 2

Data sources

Full-time certificated staff (such as teachers, school nurses, speech therapists, and school-site administrators) employed by California school districts, county offices of education, and regional occupation centers participate in the California State Teachers' Retirement System (CalSTRS) defined benefit program.[1] Nonteaching, noncertificated school employees working halftime or more (often referred to as classified employees) generally belong to a different system, the California Public Employees' Retirement System (California State Teachers' Retirement System 2011a). While community college employees are included in the CalSTRS database, they were excluded from the dataset.

For this study, both district- and state-level data for 1995/96–2009/10 were obtained by special request from CalSTRS. These data show, for each school year and age, the number of current CalSTRS members, retiring members, and members who had previously retired but who worked during that year. Because counts of individuals were provided for each year, this dataset is a pooled cross-sectional dataset rather than a longitudinal dataset (which includes data on the same individuals over time).

Annual district-level financial data were collected from the California Department of Education (2011). The California Department of Education reports unaudited revenue received by districts from various sources starting with the 1995/96 school year, which is the initial year for this study. Data were collected on the revenue limit (funds received for general purposes), which are typically a combination of local property taxes and state funds (Public Policy Institute of California 2010), and on other state revenue and other local revenue. Appendix A provides further information on revenue sources. Revenue was converted to a per student basis by dividing the total by the average daily attendance for each district.

Publicly available annual county-level unemployment rates in California over 1995–2010 were retrieved from the California Employment Development Department (2011).

Note

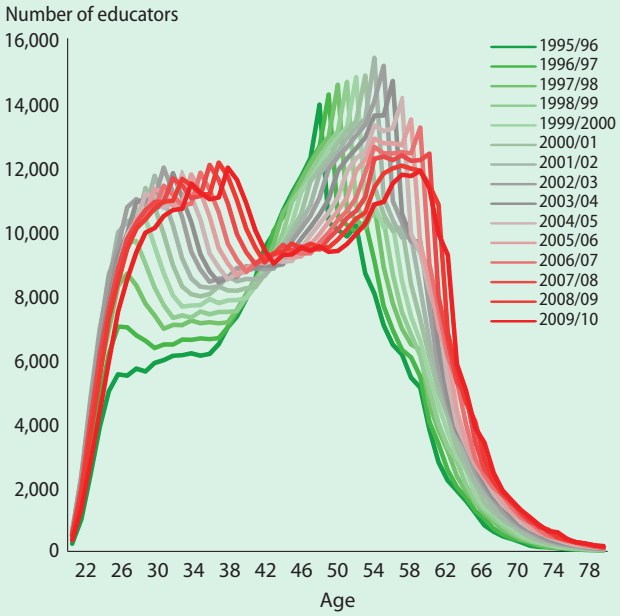
1. As described in the CalSTRS member handbook, individuals are eligible for the defined benefit program if they are an employee of the California public school system, prekindergarten through community college; are in a position that requires a credential, certificate, or permit; or meet the minimum standards adopted by the Board of Governors of the California Community Colleges (California State Teachers' Retirement System 2011c).

risen. Between 1995/96 and 2009/10, the ages of educators in the 75th percentile rose from 52 to 57 and in the 90th percentile from 58 to 62. There was little change in the age of younger educators: the 10th percentile was 30 in both 1995/96 and 2009/10, and the 25th percentile declined slightly during that period, from 37 to 36. Additionally, the average age of California's educators rose over the period, from 44.9 in 1995/96 to 46.1 in 2009/10 (table 1).

In 1995/96, the peak of the statewide age distribution was at approximately 49 years of age; this peak gradually shifted to the right in the years that followed (figure 1). The peak also began to fall in 2001/02—that is, the peak of this age distribution consisted of fewer educators with each subsequent year that passed—when the peak consisted of educators age 55. A secondary peak emerged in 1996/97 as a new group of younger educators in their late 20s entered the workforce, and that peak also shifted to the right over the study period. The age distribution was bimodal as of 2009/10, with two large groups of California educators clustered around age 39 and age 60.[8]

The numbers of educators within specific retirement-related age ranges changed over the 15 years of the study (table 2). The proportion of school staff over age 50 increased from 31.4 percent in 1995/96 to 39.6 percent in 2009/10, and the proportion over age 60 more than doubled, from 5.5 percent to 14.2 percent.

FIGURE 1
Age distribution of California preK–12 educators, 1995/96–2009/10



Source: Authors' analysis based on data obtained by special request from CalSTRS (see box 2 and appendix A).

While the proportion ages 56–65 increased from 14.2 percent in 1995/96 to 23.4 percent in 2009/10, the proportion ages 51–60 declined from 25.9 percent to 25.4 percent. That is because the proportion ages 51–55 dropped from 15.7 percent to 11.8 percent, while the proportion ages 61–65 increased from 4.1 percent to 9.8 percent.

The majority of retirements occurred among educators ages 57–66—in 2009/10, 80 percent

TABLE 1
Age distribution of California preK–12 educators, 1995/96–2009/10 (years)

Age distribution	1995 /96	1996 /97	1997 /98	1998 /99	1999 /2000	2000 /01	2001 /02	2002 /03	2003 /04	2004 /05	2005 /06	2006 /07	2007 /08	2008 /09	2009 /10
Mean	44.9	44.6	44.5	44.4	44.4	44.5	44.6	44.8	45.1	45.2	45.3	45.4	45.5	45.7	46.1
10th percentile	30	29	28	28	28	28	28	28	29	29	29	29	29	29	30
25th percentile	37	36	35	35	34	34	34	34	34	34	35	35	35	35	36
50th percentile	46	46	46	46	46	46	46	46	46	46	46	46	45	45	46
75th percentile	52	53	53	53	53	54	54	55	55	55	55	56	56	56	57
90th percentile	58	58	58	59	59	59	60	60	60	60	61	61	61	62	62

Source: Authors' analysis based on data obtained by special request from CalSTRS (see box 2 and appendix A).

TABLE 2
Proportion of the California preK–12 education workforce within specific retirement-related age ranges, 1995/96–2009/10 (percent)

Year	Over 50	Over 60	Ages 51–60	Ages 56–65	Ages 51–55	Ages 61–65
1995/96	31.4	5.5	25.9	14.2	15.7	4.1
1996/97	31.6	5.8	25.8	14.4	15.7	4.3
1997/98	33.3	6.3	27.0	15.1	16.4	4.5
1998/99	34.2	6.6	27.6	15.7	16.6	4.8
1999/2000	35.2	7.1	28.1	16.5	16.7	5.1
2000/01	36.1	7.6	28.5	17.2	16.7	5.4
2001/02	36.9	8.0	28.8	17.8	16.7	5.6
2002/03	37.7	8.6	29.0	19.3	15.7	5.9
2003/04	38.6	9.4	29.2	20.4	15.2	6.5
2004/05	38.8	9.9	28.9	21.0	14.6	6.7
2005/06	38.8	10.2	28.5	21.5	14.0	7.0
2006/07	39.1	11.0	28.1	22.3	13.3	7.5
2007/08	39.0	12.3	26.6	22.6	12.5	8.5
2008/09	39.0	13.2	25.8	22.8	12.0	9.1
2009/10	39.6	14.2	25.4	23.4	11.8	9.8

Source: Authors' analysis based on data obtained by special request from CalSTRS (see box 2 and appendix A).

of retirements were among educators in this age range. The 10th percentile of the age distribution of those retiring in 2009/10 was age 57 and the 90th percentile was age 66. The increase in the proportion of educators ages 56–65 as of 2009/10 therefore implies that there is expected to be a larger number of educators retiring.

Changes in retirement rates of preK–12 certificated educators in the peak retirement age range of 58–64

Retirement rates are on an upward trend. Three of the study years—1995/96, 2003/04, and 2009/10—had higher retirement rates across all ages than did the other study years (figure 2).[9] With the exception of those age 58, retirement rates for all ages in 2009/10 were the highest since 2003/04, a year that had the highest retirement rates across all ages since 1997/98.

In 2009/10, the retirement rate rose for each additional year of age from the ages of 58 through 63. Over the broader range of ages 55–70, retirement rates reached a maximum among those age 66, at 23.3 percent in 2009/10 (see table B1 in appendix B).

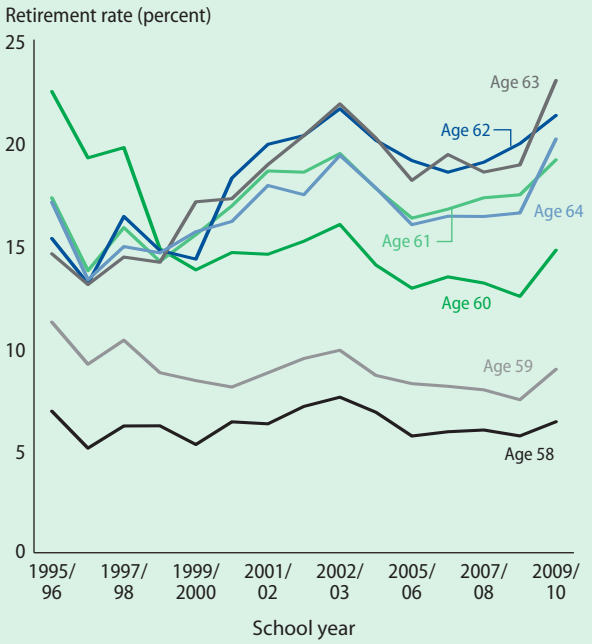
Retirement decisions, district revenue, and unemployment rates

Regression analysis was used to examine relationships between individuals' retirement decisions and district-level revenue per student and county-level unemployment rates (table 3).[10] In this section, odds ratios compare the probabilities of retiring between groups exhibiting one-unit differences in the independent variable (either the revenue variables measured in thousands or the unemployment variables).

The results show a negative and statistically significant relationship between retirements and other local revenue per student (see box 1 and appendix A for definitions of district revenue types). On average, a $1,000 reduction in a district's other local revenue per student was associated with approximately a 4 percent higher probability of educators retiring. No statistically significant relationship

FIGURE 2

Retirement rates at ages 58-64 for the California preK–12 education workforce, 1995/96 to 2009/10



Note: The figure displays retirement rates for individuals of various ages for each year. Because these are repeated cross-sections of individuals for each year and not cohorts of individuals followed over time, each consecutive point on a given trend line comprises a different group of people. Nonetheless, individuals included in the retirement calculation on one line in a given year are, by and large, the same individuals as those on a different line in the following year (minus those who retire and plus or minus other smaller inflows and outflows).

Source: Authors' analysis based on data obtained by special request from CalSTRS (see box 2 and appendix A).

TABLE 3

Logistic regression of an individual California preK–12 educator's retirement decision (odds ratios)

Independent variable	Model 1 Unemployment in prior year	Model 2 Unemployment in current year
Revenue limit per student (thousands)	1.0089 (.0073)	1.0089 (.0073)
Other state revenue per student (thousands)	0.9769 (.0125)	0.9768 (.0124)
Other local revenue per student (thousands)	0.9606** (.0100)	0.9609** (.0101)
Prior year unemployment rate	1.0037 (.0041)	
Current year unemployment rate		1.0041 (.0043)
Number of observations	1,879,935	1,879,935

** Significant at the 5 percent level.

Note: The revenue limit includes revenue from such sources as property taxes, supplemental taxes, and community redevelopment funds. Other state revenue includes such sources as child nutrition programs, child development apportionments, and the state lottery. Other local revenue includes such sources as parcel taxes, other non–ad valorem taxes, and interest earned. Numbers in parentheses are standard errors. Additional variables were included in the regression model, but since they served only as control variables, they are not reported in this table. They were age, age squared, age cubed, and 14 school year indicator variables. See appendix A for details.

Source: Authors' analysis of data obtained from CalSTRS (obtained by special request), the California Department of Education (2011), and the California Employment Development Department (2011).

was found between retirements and the revenue limit per student, other state revenue per student, or county-level unemployment in either the prior or the current year.

These results differ from those of previous studies that have found that workers are more likely to delay retirement during recessions. This study's focus on public sector workers (educators in particular) likely accounts for this difference. The general working population may continue working longer in a recession to improve financial security, whereas the loss of tax revenue during a recession is likely to affect educators in additional ways.

The California Legislative Analyst's Office documents a 5 percent reduction in California spending per student over 2007/08–2010/11 (Taylor 2011b). Results of a survey sent to school districts showed that districts were responding to reductions in spending by diverting funding from programs such as professional development, school counseling, supplemental instruction, and deferred maintenance. The Legislative Analyst's Office also reports that average class sizes have increased in recent years. These poorer working conditions may be leading some educators to retire sooner than they otherwise would have. In addition, many districts have offered early retirement incentives in recent years as a way of lowering operating expenditures over the long run. Unfortunately, no information could be accessed on which districts have offered these incentives.

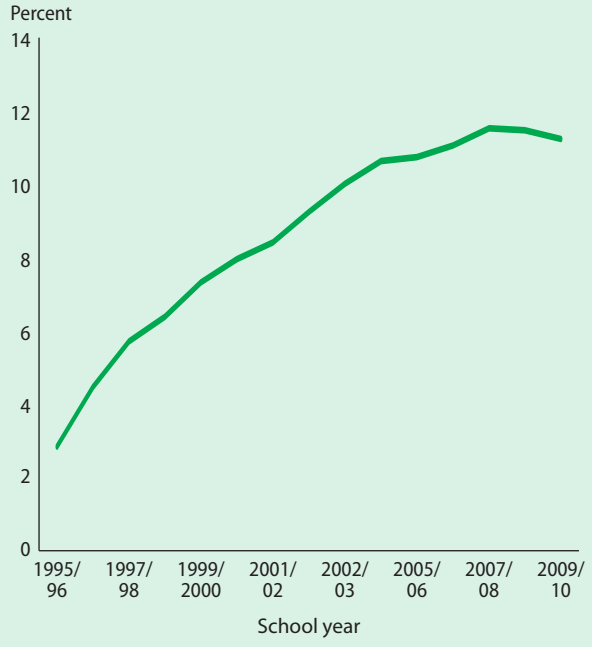
While there are limitations to this regression analysis (described later in the report), understanding that there is a negative correlation between other local revenue and educator retirements could help administrators and policymakers plan. For instance, if poor economic forecasts suggest that district revenues are likely to decline in California in the foreseeable future (see, for instance, EdSource 2011), districts might also expect higher retirement rates.

Changes in the percentage of preK–12 retirees employed in the California public school system after retirement

Over the study period, the percentage of retired California educators working in the California public school system after retirement increased steadily. In 1995/96, about 3 percent of retirees were working in California schools, compared with more than 11 percent in 2007/08–2009/10 (figure 3).[11] This increase in postretirement employment may be mitigating the impact of rising retirement rates over the period. With an increase of about 8 percentage points in the working retired and an assumed overall baseline retirement rate of 15 percent, there would be a 1.2 percent increase in retirees returning to the classroom in 2009/10 compared with 1995/96 (0.08*15 percent).

FIGURE 3

Percentage of California preK–12 retirees working in the California public school system after retirement, 1995/96–2009/10



Source: Authors' analysis based on data obtained by special request from CalSTRS (see box 2 and appendix A).

STUDY LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

There are several limitations to the findings presented in this report. The financial data from the California Department of Education have not been audited. School districts, county offices of education, joint powers agencies, and certain charter schools send their financial data to the California Department of Education. The Financial Accountability and Information Services annually collects, reviews, and prepares these financial data for dissemination. While this is a high-level review, errors may remain since a more complete audit has not been performed.

While the analysis of the correlates with retirements represents a step toward a better understanding of the factors that influence educators' retirement decisions in California, the analysis does not include all personal and district characteristics that might have an impact on retirement decisions. To that extent, the analysis is incomplete. For instance, household wealth, personal health, working conditions, specific job responsibilities, length of employment, and job satisfaction are all personal characteristics that could have an impact on an educator's decision to retire. Whether the district offered early retirement incentives could also affect the retirement decision. Data on these variables were not available.

Finally, while the CalSTRS database can track retired CalSTRS members who return to work in the California public school system (including people returning to work in charter schools, public schools, district offices, and community colleges in California), the data cannot track individuals who go back to work outside the California public

school system. For instance, individuals returning to work in education in another state or individuals pursuing employment in a different field cannot be observed in the datasets. It is unclear what percentage of postretirement workers are employed outside the California public school system, and the authors are unaware of any statistics that would shed light on the extent of this limitation. However, because the current analysis is concerned specifically with the California school system and how it is affected by retirements and postretirement employment, this analysis should still be helpful to policymakers grappling with issues concerning the California educator workforce.

This research begins to explore topics that have not yet been fully examined in California. Additional areas of local inquiry might include early retirement incentives or postretirement employment offerings. On incentives, research might examine variation at the local level, such as the types of districts that are offering early retirement incentives, the impact of these incentives on retirement behavior, and the characteristics of individuals who respond to the incentives. On postretirement employment, research could examine which retired educators are returning to work, to what kind of work, for how long, and whether the findings align with state policy intentions.

APPENDIX A
DATA SOURCES AND METHODOLOGY

This appendix describes the data used in the study and the study methodology.

Data sources

Three data sources were used in this analysis: California State Teachers' Retirement System (CalSTRS) (obtained by special request), the California Department of Education (2011), and the California Employment Development Department (2011).

The CalSTRS database includes all certificated employees of public schools who work halftime or more. In addition, certificated employees of charter schools and certificated staff who work less than halftime may elect to participate in CalSTRS. The data received from CalSTRS were aggregated to include only counts of members by year and age; no personally identifiable information was included.

District revenue data on three sources of revenue were collected from the California Department of Education: the "revenue limit," "other state revenue," and "other local revenue." The revenue limit consists of Standardized Account Code Structure (SACS) object codes 8010–8099.[12] The revenue limit includes revenue from such sources as property taxes, supplemental taxes, community redevelopment funds, and royalties and bonuses. Other state revenue consists of SACS object codes 8300–8599 and includes such funding sources as state revenue for child nutrition programs, child development apportionments, and the state lottery. Other local revenue consists of SACS object codes 8600–8799 and includes such sources as parcel taxes, other non–ad valorem taxes, and interest earned. Revenue from all these SACS object codes for a given source were summed by district to calculate a district's total annual revenue from each source.[13]

These three revenue sources were included in the analysis because together they account for all state and local revenue received by districts. These revenue sources are also more likely than federal revenue to have been adversely affected by the recent recession. For instance, the American Recovery and Reinvestment Act of 2009 appropriated approximately $100 billion to the U.S. Department of Education to stabilize state education budgets, among other uses (U.S. Department of Education 2010; U.S. Government Accountability Office 2009; Taylor 2011b). For this reason, federal revenue is excluded from this analysis. Historically, the revenue limit has accounted for approximately 60 percent of school district revenues, other state revenue for 22 percent, and other local revenue for 8 percent (California Budget Project 2009); federal

TABLE A1
Variable names, definitions, means, and standard deviations

Variable	Definition	Mean (most recent year)	Standard deviation (most recent year)
Revenue limit per student ($)[a]	Revenue for general purposes; it is a combination of local property taxes and state funds.	6,837.9	5,339.1
Other state revenue per student ($)[a]	Consists of all other state revenue that is not included in the revenue limit such as revenue for child nutrition programs and the state lottery.	2,011.5	1,775.6
Other local revenue per student ($)[a]	Consists of all other local revenue that is not included in the revenue limit such as parcel taxes, other non–ad valorem taxes, and interest earned.	1,167.4	3,532.6
Unemployment rate (percent)	County-level unemployment rate	12.8	2.7

a. Measured in thousands for the logistic regression.

Source: Authors' analysis of data obtained from the California Department of Education (2011) and the California Employment Development Department (2011).

revenue has accounted for the other 10 percent or so. Table A1 provides descriptive statistics for these revenue variables.

Methodology

To answer the first research question about the age distribution of California educators, descriptive statistics, such as the mean, 10th percentile, 25th percentile, and median (50th percentile) were calculated.

To answer the second research question, the state retirement rate for individuals at each age between 55 and 70 was calculated by dividing the total number of CalSTRS members of a given age who retired in that year by the total number of CalSTRS members of that age who worked that year.

Regression analysis was used to answer the third research question on how individuals' retirement decisions correlate with personal, school district, and county characteristics. Each individual's retirement decision (yes/no) in a given year was examined in relation to the individual's age, the state and local revenue per student of the school district, and the unemployment rate (for the current year or the previous year) of the county. The analysis included all preK–12 CalSTRS members who were over age 50 and who were employed in school districts during 1995/96–2009/10; the analytic sample was restricted to individuals over age 50 because no retirements were observed in younger individuals.[14]

A logistic regression accounted for the binary nature of the outcome variable (an individual either retired or did not retire).[15] The logistic regression took the following form:

$$Pr(RETIRE_{idcy} = 1) = logit^{-1}(\beta_1 AGE_{idcy} + \beta_2 AGE^2_{idcy} + \beta_3 AGE^3_{idcy} + \beta_4 REVENUE\_LIMIT_{dcy} + \beta_5 STATE\_REV_{dcy} + \beta_6 LOCAL\_REV_{dcy} + \beta_7 UNEMPLOYMENT_{cy-1} + \boldsymbol{\alpha}' \boldsymbol{YEAR} + \varepsilon_{idcy}) \quad \text{(A1)}$$

where $Pr(RETIRE = 1)$ is the probability that a CalSTRS member retired, AGE is the age of the CalSTRS member, AGE^2 is the member's age squared, AGE^3 is the member's age cubed,[16] $REVENUE\_LIMIT$ is the district's revenue limit per student, $STATE\_REV$ is the district's other state revenue per student, $LOCAL\_REV$ is the district's other local revenue per student, $UNEMPLOYMENT$ is the county-level unemployment rate,[17] $\boldsymbol{YEAR}$ is a vector of binary indicator variables representing each of the years 1996/97–2009/10 (1995/96 is the comparison year), and ε is the error term. β_1–β_7 and $\boldsymbol{\alpha}$ are odds ratios that are estimated from the data. Subscript i refers to the individual, d refers to the school district, c refers to the county, and y refers to the school year. Because individuals are clustered at the district level and so the retirement decisions of members within the same district might not be independent, cluster-robust standard errors were calculated that account for intragroup correlation within each district (Liang and Zeger 1986).

For the regression analysis, which requires individual-level data, the aggregated data obtained from CalSTRS (counts of individuals) were disaggregated to the individual level. For instance, district X might have reported 100 active members and 20 members who retired in a given year for a given age. This information was used to generate 100 row observations for district X, with each row representing one individual of that age for that year. The variable $RETIRE$ was created to be equal to one for 20 of those rows and equal to zero for the other 80 rows pertaining to that district in that year.

The results for the third research question are reported as odds ratios. If two outcomes (retiring and not retiring) have the probabilities (p, 1–p), then $p/(1–p)$ is the odds. The ratio of two odds is called the odds ratio; for example, for a revenue limit per student of \$5,000 (p_1) versus \$4,000 (p_2), the odds ratio is $[p_1/(1–p_1)]/[p_2/(1–p_2)]$. If the odds ratio is greater than 1, then the odds of retirement at \$5,000 is greater than the odds of retirement at \$4,000. In other words, as the revenue limit per student rises, the odds of retirement also rise (there is a positive relationship). If the odds ratio

is less than 1, then there is an inverse or negative relationship: the odds of retirement fall as revenue rises, and vice versa.

To answer the fourth research question, the percentage of CalSTRS retirees working after retirement in the California public school system for a given year was calculated by dividing the total number of postretirement CalSTRS employees working by the total number of CalSTRS retirees.

APPENDIX B
RETIREMENT RATE BY AGE AND SCHOOL YEAR

Table B1 presents retirement rates for ages 55–70 over the study period. Retirement rates were higher among all ages in 2009/10 than in 2008/09. In addition, 60-year-olds retired at the highest rates in 1995/96 but at lower rates than older individuals in 2009/10, when they had the 11th highest retirement rate among those ages 55–70.

TABLE B1

Retirement rates by age and school year, 1995/96–2009/10 (percent)

School year	Age															
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
1995/96	5.7	4.5	5.2	6.9	11.2	22.5	17.3	15.3	14.6	17.1	21.7	17.7	16.9	18.0	18.5	18.8
1996/97	4.7	3.4	3.8	5.1	9.2	19.2	13.7	13.1	13.1	13.3	15.2	14.9	14.2	12.7	11.7	13.4
1997/98	4.8	4.3	5.3	6.2	10.3	19.7	15.8	16.4	14.4	14.9	16.4	16.8	13.9	14.7	15.6	15.5
1998/99	5.1	3.7	4.7	6.2	8.8	14.8	14.2	14.7	14.1	14.6	17.2	17.8	16.6	15.6	14.7	19.2
1999/2000	4.4	3.6	4.4	5.3	8.4	13.8	15.5	14.3	17.1	15.6	18.5	18.3	15.5	19.8	17.7	16.7
2000/01	4.6	4.0	4.6	6.4	8.1	14.6	16.9	18.2	17.2	16.1	17.0	17.1	14.4	16.6	14.5	18.1
2001/02	4.3	4.1	4.8	6.3	8.8	14.5	18.6	19.9	18.9	17.9	17.9	16.6	16.2	15.7	13.3	19.0
2002/03	4.3	4.7	5.5	7.1	9.4	15.2	18.5	20.3	20.3	17.4	18.5	19.3	17.3	16.7	17.3	19.4
2003/04	4.3	4.6	5.8	7.6	9.9	16.0	19.4	21.6	21.9	19.4	21.5	20.4	16.9	19.4	19.3	20.2
2004/05	4.6	4.4	5.2	6.8	8.6	14.0	17.7	20.1	20.2	17.8	20.4	19.6	18.1	17.1	16.9	20.3
2005/06	4.4	4.0	4.6	5.7	8.2	12.9	16.3	19.1	18.1	16.0	17.4	16.7	16.5	16.1	17.7	14.0
2006/07	4.2	3.6	4.0	5.9	8.1	13.4	16.7	18.5	19.4	16.4	17.9	17.2	14.6	17.8	17.0	16.9
2007/08	4.3	3.9	3.9	6.0	7.9	13.1	17.3	19.0	18.5	16.4	18.8	18.1	15.7	15.8	16.9	17.6
2008/09	4.0	3.4	3.8	5.7	7.4	12.5	17.4	19.9	18.9	16.5	19.5	18.7	16.6	16.5	15.2	16.5
2009/10	4.4	4.0	4.6	6.4	8.9	14.7	19.1	21.3	23.0	20.2	22.9	23.3	20.5	20.0	20.9	22.5

Source: Authors' analysis based on data obtained by special request from CalSTRS (see box 2 and appendix A).

NOTES

1. All California charter school educators are also eligible to opt into the CalSTRS defined benefit program (California Education Code §47605[b][5][K]; §47611), and approximately 90 percent participate (Olberg and Podgursky 2011). In addition, all certificated and community college employees of public schools who are employed at least halftime are required to participate in CalSTRS (California State Teachers' Retirement System 2007). Part-time certificated staff and substitutes hired to work less than halftime may elect to participate, but CalSTRS is their default retirement plan, and they must participate after accumulating a certain number of work hours in a given school district (California Education Code §22501–22504). While some districts allow employees to participate in a defined contribution plan in addition to the CalSTRS program, CalSTRS does not have access to data on these plans. Nonteaching, noncertificated school employees working halftime or more are members of the California Public Employees' Retirement System (California State Teachers' Retirement System 2011a).

2. Costrell and Podgursky (2009, p. 194) explain: "This is not because the annual pension annuity falls. In fact, it is rising (although eventually teachers hit a pension cap typically set at 100 percent of earnings). Instead, pension wealth falls because the teacher collects the pension for one less year and the annual payment is not enhanced sufficiently to offset this loss."

3. The age factor is 1.1 percent of final compensation at age 50 and increases gradually to a maximum of 2.4 percent at age 63 and older. In addition, retiring members with 30 or more years of service receive a career factor bonus (an additional 0.2 percent) added to their age factor. These benefit factors were last revised in 1998, when "to induce teachers to delay retirement" (Friedberg 2011, p. 351), the California legislature both raised the maximum value from 2.0 percent to 2.4 percent and provided the 0.2 percent career factor bonus for 30 years of service (California State Teachers' Retirement System 2011a). According to Brown (2009, p. 8), the potential impact of these two changes was quite large, as "the financial return to working an additional year at age 60 nearly doubled." Two years later another key policy change related to final compensation was made for CalSTRS members with at least 25 years of credited service: as of 2000, their final compensation for benefits purposes was based on their highest single year of compensation, rather than the average over their highest three years (California State Teachers' Retirement System 2011a).

4. The average retirement benefit for members was $4,256 per month in 2009/10 (California State Teachers' Retirement System 2010).

5. Recent data on a single year for all CalSTRS members (including community college employees) suggest that 25,253 retired members, or approximately 14 percent of CalSTRS retirees, worked in California in 2006/07 (California State Teachers' Retirement System 2008). The current study will examine historical data specifically for preK–12 educators.

6. California's rules governing educators' postretirement employment changed in July 2010. Now, retirement benefits of retirees under age 60 who return to CalSTRS-covered employment immediately after retirement are reduced dollar for dollar for earnings during the period from retirement to age 60 or for the six months following the effective retirement date, whichever is shorter. Additional information about postretirement employment eligibility is available on the CalSTRS website at www.calstrs.com/members/defined%20benefit%20program/wkafterret.aspx.

7. Previous analyses of retirement rates by age have shown that retirement rates increase

among those ages 58 and older (White and Fong 2008; White, Fong, and Makkonen 2010). In addition, data on workforce participation by age have shown that the number of educators in the labor force declines for every age over 58 years old. For instance, there were approximately 9,000 teachers in California age 58 compared with about 1,000 teachers age 65. Due to the smaller samples of individuals older than 64, this research question is restricted to those ages 58–64. Appendix B reports retirement rates of individuals ages 55–70.

8. Similar results have been identified nationwide. Ingersoll and Merrill (2010) found that the national age distribution of teachers had shifted from a singular, tall peak with a modal age of 41 in 1987/88 to a flatter distribution with two smaller peaks around ages 28 and 57 in 2007/08. The authors note that this second peak of teachers, those in their late 20s, reflects a recent surge in the number of beginning teachers across the country, a group that includes a growing number of professionals who have changed careers.

9. Figure 2 shows repeated cross-sections of individuals for each year rather than cohorts of individuals followed over time, so each consecutive point on a trend line comprises a different group of people. Nonetheless, individuals included in the retirement calculation on one line in a given year are, by and large, the same individuals as those on a different line in the following year. This is important because retirement shocks to the labor market (such as early retirement incentives that induce people to retire or shocks that induce people to delay retirement) in one year will affect retirement rates in future years. Imagine that early retirement incentives were offered in 2008/09 and that many educators accepted the offer. Retirement rates in 2008/09 would then be higher, and the remaining pool of educators would be smaller in future years (assuming that the retiring workers are not replaced by younger workers); this means that the denominator in the retirement rate calculation is smaller for future years. The reduced denominator would imply a higher retirement rate in 2009/10. However, fewer educators might choose to retire in 2009/10 because those who were still working were likely more attached to their profession, given that they chose not to accept the early retirement incentive in 2008/09. This would lower the numerator in the retirement rate calculation in 2009/10. In short, the retirement rate lines for each age are connected across years, and temporal shocks in any given year will affect the retirement rate lines in subsequent years, although exactly how is difficult to predict.

10. As described in equation A1 in appendix A, age, age squared, age cubed, and school year indicator variables were also included in the model. However, because these are control variables and not central to the research question, they are not reported in table 3. As expected, all of the age-related variables were statistically significant at the 5 percent level.

11. As noted earlier, the California legislature instituted several postretirement earnings exemptions for educators during the study period, including for educators returning to serve in administrative positions necessary to ensure or restore financial stability to a troubled school district (passed in 1995), to teach in classrooms affected by the state's class-size reduction program (1997), to provide direct remedial instruction to students before or after school or during the summer (2000), to train teachers or paraprofessionals in an internship or alternative certification program (2000), to perform creditable service in an emergency situation to fill a vacant administrative position (2000), and to provide instruction in special education or English language learner programs (2004; California State Teachers' Retirement System 2011a). Retired CalSTRS members are generally prohibited from employment in classified positions,

except for working as a teacher's aide under certain circumstances (California State Teachers' Retirement System 2011b).

12. The SACS is a comprehensive accounting system used by California districts and schools for reporting revenue, expenditures, assets, liabilities, and fund balances. The four-digit object code enables entities to classify revenue by source and type, to classify expenditures by type of service, and to classify balance sheet accounts as assets, liabilities, or fund balances (California Department of Education 2008).

13. Although it was not until 2003/04 that all districts reported in the SACS accounting framework, the object codes were the same in prior years, allowing for direct comparisons over time.

14. Charter school and county office employees were excluded from this analysis. California's charter schools have different funding streams than the state's traditional public schools and more fiscal discretion. They are not required to report unaudited financial statements to the state, so revenue data were unavailable for many charter schools. County office employees were excluded because many county offices provide services to schools and districts but do not enroll students, so calculating per student allotments was impossible. Overall, California's charter school and county office employees represent less than 7.5 percent of CalSTRS members.

15. Survival analysis, which examines the association of an individual's decision to continue working with personal, school district, and county characteristics, is an alternative strategy for answering this question, but it requires longitudinal data. The dataset used in this study contains pooled cross-sections of individuals over each of the 15 years, meaning that individuals in the dataset could not be tracked over time.

16. AGE, AGE^2, and AGE^3 were included as control variables. Polynomial age terms (quadratic, cubic, quartic, and so on) were added to the model until the highest degree polynomial term was not significant.

17. Two models were estimated. The first used the previous calendar year's unemployment rate to test the hypothesis that the retirement decision is made in the early part of the school year rather than at the end of the school year. The second used the current year's rate to test the hypothesis that the retirement decision is made in the second half of the school year.

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