



How Much Do Colorado Teachers Gain from the State Retirement System?

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Like most states, Colorado provides a final average salary defined-benefit pension plan to public school teachers. These pensions provide retirees with a lifetime income stream based on their years of service and the salary they received near the end of their career. Unlike most teachers, however, Colorado teachers do not generally earn Social Security benefits, so most of their retirement income comes from their pensions. Colorado's state retirement system has attracted attention recently for its deteriorating financial status, which so far has required only modest benefit reductions but could trigger larger cuts in the future.¹ Less attention has focused on how much retirement security the system provides teachers.

In this brief, we compute annual and lifetime pension benefits for Colorado teachers and show how they vary with years of service and age when hired. We also estimate how long teachers must remain in the classroom before they gain anything from the retirement system. The results show that long-term teachers receive substantial retirement benefits, but shorter-term teachers receive much less. Teachers hired at older ages also gain more from the retirement system than those hired at younger ages. These differences, which are often sizeable, create inequities in teacher compensation that do not appear to reflect productivity differences. Before enacting further benefit cuts, state policymakers should consider the impact on teachers' retirement security, especially for those who spend less than a full career in Colorado classrooms.

Colorado's Public Employee Retirement Association

Established by state law in 1931, Colorado's Public Employees' Retirement Association (PERA) provides retirement benefits for school districts, state employees, the state's judicial system, and many municipalities in the state. In 2018, the system made payments to 123,000 retirees totaling \$4.6 billion

and promised future benefits to another 211,600 active employees (PERA 2019). About half of PERA members are employed in Colorado's public schools.

Retirement benefits are funded by contributions from employers and employees and by investment income from the system's trust fund. The system held assets worth \$46 billion at the end of 2018 and earned an average annual return of 8.8 percent on its investments over the past 10 years (PERA 2019). However, PERA's financial situation has deteriorated sharply over the past two decades, primarily because employers have not contributed enough to the system. In 2001, the system held enough assets to cover 98.6 percent of expected future benefits (PERA 2011). This funded ratio fell to 75.1 percent in 2007, just before the 2008 financial crisis and the Great Recession, then declined to 61.2 percent in 2011 in the wake of large investment losses caused by the 2008 stock market crash. Since then, the funded ratio has fluctuated around that level; in 2018, it dipped to 59.8 percent, one of the lowest funded ratios of any state retirement plan (Pew Charitable Trusts 2019). The system's unfunded liabilities now stand at \$31 billion. PERA's school division, with a funded ratio of 57.9 percent in 2018, is in somewhat worse financial shape than the overall system.

In response to PERA's deteriorating financial situation, Colorado's General Assembly passed Senate Bill 200 (S.B. 18-200) in 2018 to restore the system to full funding over the next 30 years.²² The bill, signed into law by Governor John Hickenlooper, raises contributions from employers and employees, directs the state of Colorado to allocate \$225 million each year to PERA to reduce the unfunded liability, cuts retirement benefits, and establishes an automatic adjustment provision that will raise contributions and lower benefits if PERA's financial situation deteriorates. These automatic provisions will help stabilize system finances, but they could significantly reduce the value of the retirement system to teachers.

Benefit Rules

Upon retirement, teachers covered by PERA's school district division receive an annual pension equal to 2.5 percent of their final average salary multiplied by the number of service years they have completed. Thus, retired teachers who spent 30 years in the classroom receive a pension equal to 75 percent of their final average salary each year until they die. The system caps annual pensions at 100 percent of final average salary. For newly hired teachers, final average salary is computed as the average salary earned over the final five service years; for teachers hired before January 1, 2020, the final three service years are used. An additional service year directly raises future annual pension benefits through the benefit formula and indirectly raises future benefits by increasing final average salary, which generally increases with seniority. For most newly hired teachers, the recent extension of the salary averaging period reduces final average salary, and hence annual pension benefits, by including lower salaries in the computation.

After teachers retire, their annual benefits increase 1.5 percent each year. However, if system investment returns were negative in the previous year, the annual increase is instead set equal to the change in the consumer price index, capped at 1.5 percent. The annual increase can be reduced further

if PERA's financial situation worsens, as stipulated by the system's automatic adjustment provisions. (Before 2018, the annual increase was set at 2 percent.)

Teachers may begin collecting their pensions once they stop working and meet specific age and service requirements. Teachers hired on or after January 1, 2020, may collect full benefits if they satisfy any of the following criteria:

- completed at least 35 years of service
- reached age 64 and completed at least 30 years of service
- reached age 65 and completed at least 5 years of service

Teachers may collect early reduced benefits if they meet any of the following criteria:

- reached age 55 and completed at least 25 years of service
- reached age 60 and completed at least 5 years of service

Early benefits are actuarially reduced to offset the additional payments that early retirees can expect to collect relative to those who receive a full retirement benefit.

Teachers hired before January 1, 2020, when many of the provisions of S.B. 18-200 took effect, can collect retirement benefits earlier. For example, those hired between January 1, 2011, and December 31, 2019, can collect full benefits as early as age 58 if the sum of their age and years of completed service equal 88. Alternatively, they can collect early reduced benefits at age 50 if they completed at least 25 years of service, at age 55 if they completed at least 20 years of service, or at age 60 if they completed at least 5 years of service.

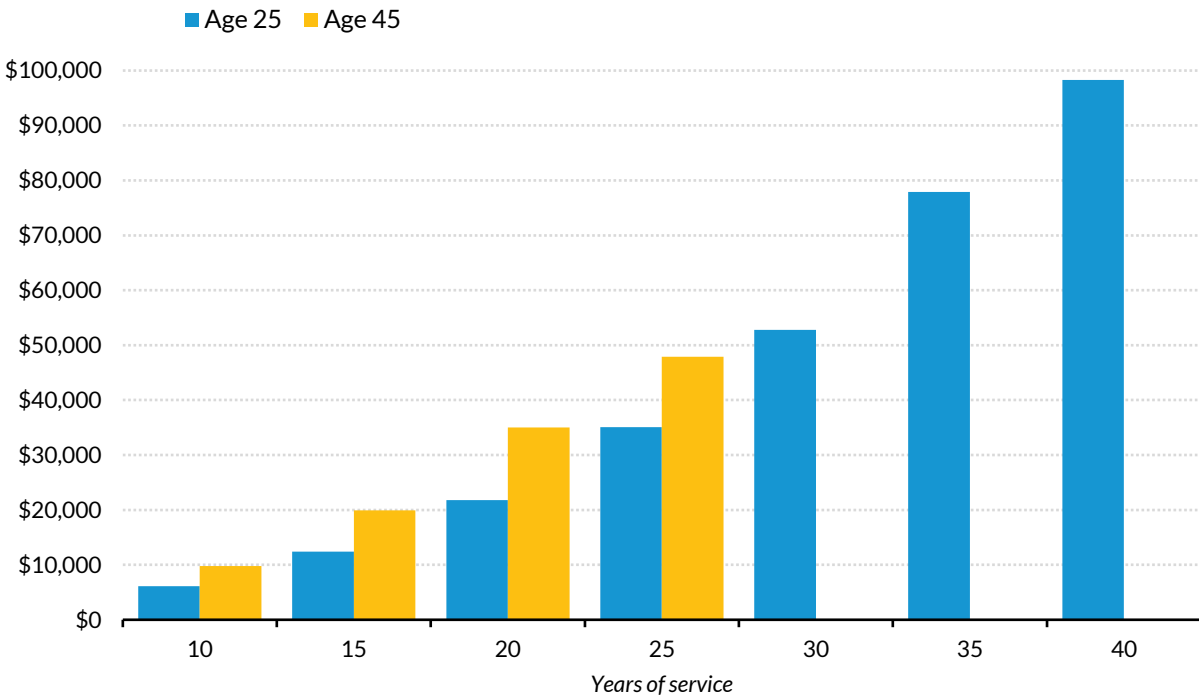
In exchange for these benefits, teachers must contribute a portion of their salary to the retirement system. The required employee contribution rate was 8 percent of salary before S.B. 18-200 took effect, but that bill gradually raises the contribution rate to 10 percent by July 1, 2021. PERA's automatic adjustment provisions can mandate additional employee contributions if the system's financial situation deteriorates. Teachers who separate with fewer than five years of service are not eligible for a pension, and the system returns their contributions with interest upon separation.

How Much Will Retired Teachers Collect?

Annual pension benefits for Colorado's retired teachers are modest for retirees with limited tenure but increase rapidly with additional service years. Teachers hired today at age 25 with an annual salary of \$40,000 who separate after completing 15 years of service receive an annual benefit of \$12,500 at age 70 (in 2019 inflation-adjusted dollars), and their counterparts with 20 years of completed service receive \$21,800 each year (figure 1). Annual benefits increase to \$52,800 for teachers who complete 30 years of service and \$98,300 for those who complete 40 years of service, nearly eight times as much as a teacher with only 15 years of completed service. However, assumed separation rates adopted by the

plan actuaries (Segal Consulting 2019) imply that only about 20 percent of male teachers and 15 percent of female teachers hired at age 25 remain in Colorado classrooms for 30 or more years.

FIGURE 1
Annual Pension Benefit at Age 70 by Years of Service and Age When Hired
Inflation-adjusted 2019 dollars



Source: Authors’ calculations.
Notes: The figure shows annual pension benefits at age 70 for teachers hired on July 1, 2021, with an annual salary of \$40,000 and who begin collecting their pension when they first qualify for unreduced benefits. The analysis uses an inflation rate of 2.4 percent and assumes salaries grow at the average rate assumed by the plan actuaries (Segal Consulting 2019).

Teachers hired at older ages receive larger pension benefits than those hired at younger ages, even if they start at the same salary and their salary grows at the same rate, because inflation does not erode pension benefits as much for older hires. After completing 15 years of service, a teacher hired at age 45 could collect \$19,900 in annual pension benefits at age 70, 60 percent more than a teacher hired at age 25 who separates after 15 years. A 25-year-old hire must wait 25 years until he or she reaches age 65 and can begin collecting, while the real value of the pension declines with inflation; a 45-year-old must wait only 5 years.

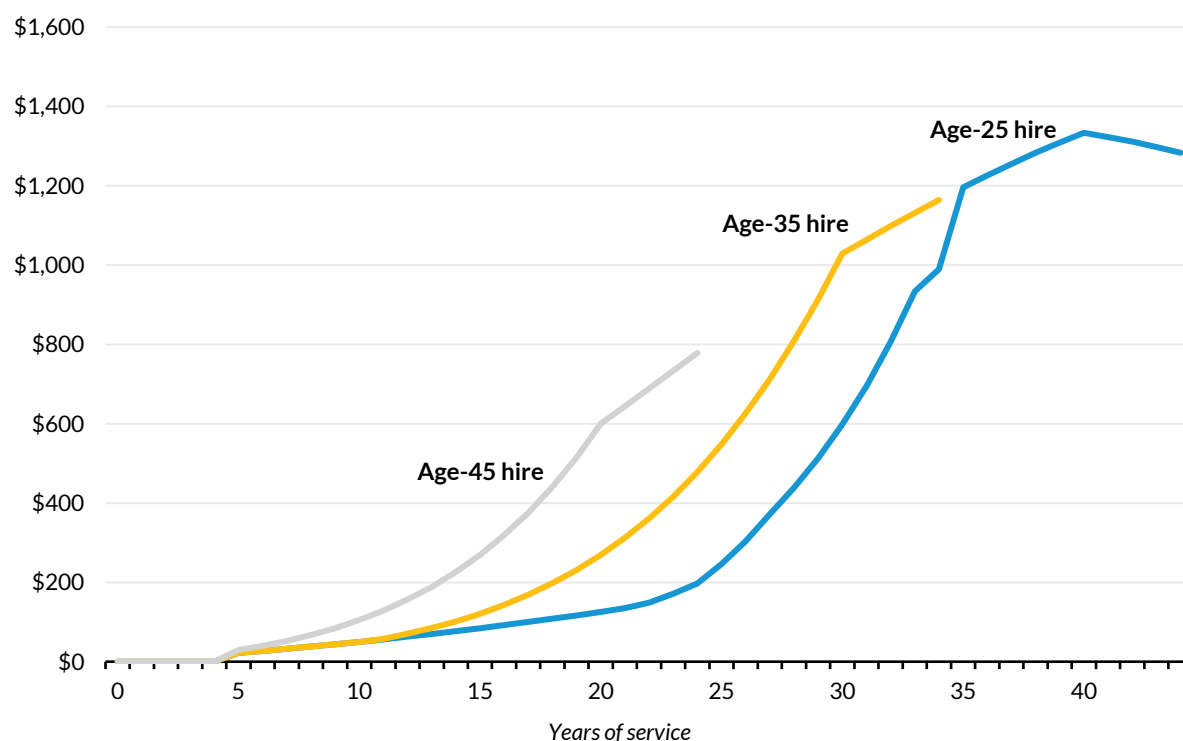
The value of a pension depends on the payments retirees expect to receive over their lifetime, not just payments at a single age. An annual payment that begins at age 50, for example, is worth more over a lifetime than the same payment that begins at age 65. We compute the expected present value of lifetime benefits by summing the expected payment each year from the age of initial benefit receipt

until age 120, the assumed maximum lifespan, adjusting each year's payments by the probability that a retiree survives to that age. Because benefits can be invested and earn interest once they are received, benefits received today are worth more than those received in the future. To account for the time value of money, we discount future benefits to the separation age using a 7.25 percent discount rate, the rate used by PERA to discount its future liabilities. Expected present values are highly sensitive to the choice of the discount rate; a lower discount rate would value future payments more and thus raise our estimate of the lifetime value of pension benefits.

FIGURE 2

Expected Value of Lifetime Pension Benefits by Years of Service and Age When Hired

Inflation-adjusted 2019 dollars (thousands)



Source: Authors' calculations.

Notes: Estimates are for teachers hired on July 1, 2021, at an annual salary of \$40,000. The analysis uses an inflation rate of 2.4 percent and discount rate of 7.25 percent (as specified by the plan trustees) and assumes salaries grow at the average rate assumed by the plan actuaries (Segal Consulting 2019).

The expected value of lifetime pension benefits is quite low early in a career, but it increases rapidly as service years accumulate (figure 2). Teachers do not accrue any pension benefits until they complete 5 years of service, because the system requires teachers to work that long before qualifying for a future pension. For teachers hired at age 25, lifetime benefits are worth \$22,000 after 5 years of service, \$50,000 after 10 years, and \$246,000 after 25 years. The value surges to \$1.2 million after 35 years of service, at which point retired teachers can collect their pensions immediately. A pension's value grows

very unevenly over a career. It takes 25 years of service for a teacher hired at age 25 to accumulate a pension worth \$246,000. However, the value of that pension grows by \$950,000 if he or she works another 10 years, and it grows by about \$200,000 if he or she then works just one more year.

Lifetime benefits peak at \$1.3 million when teachers complete 40 years of service. At that time, a pension replaces 100 percent of final average salary, the maximum share allowed by the system. The pension's value falls when teachers work more than 40 years, because teachers forgo a year of benefits for each additional year they work and the annual payment they receive increases only modestly as their final average salary grows.

Teachers hired at older ages generally accrue lifetime pension benefits more quickly because they do not have to wait as long to collect. After completing 20 years of service, lifetime benefits are worth \$600,000 for a teacher hired at age 45 and \$269,000 for a teacher hired at age 35, but only \$126,000 for a teacher hired at age 25.

The value of the state retirement system to Colorado's teachers depends on how much they must contribute to PERA as well as how much they collect over their lifetime. Subtracting teachers' required contributions from the value of lifetime pension benefits shows how much teachers gain by participating in the retirement system.

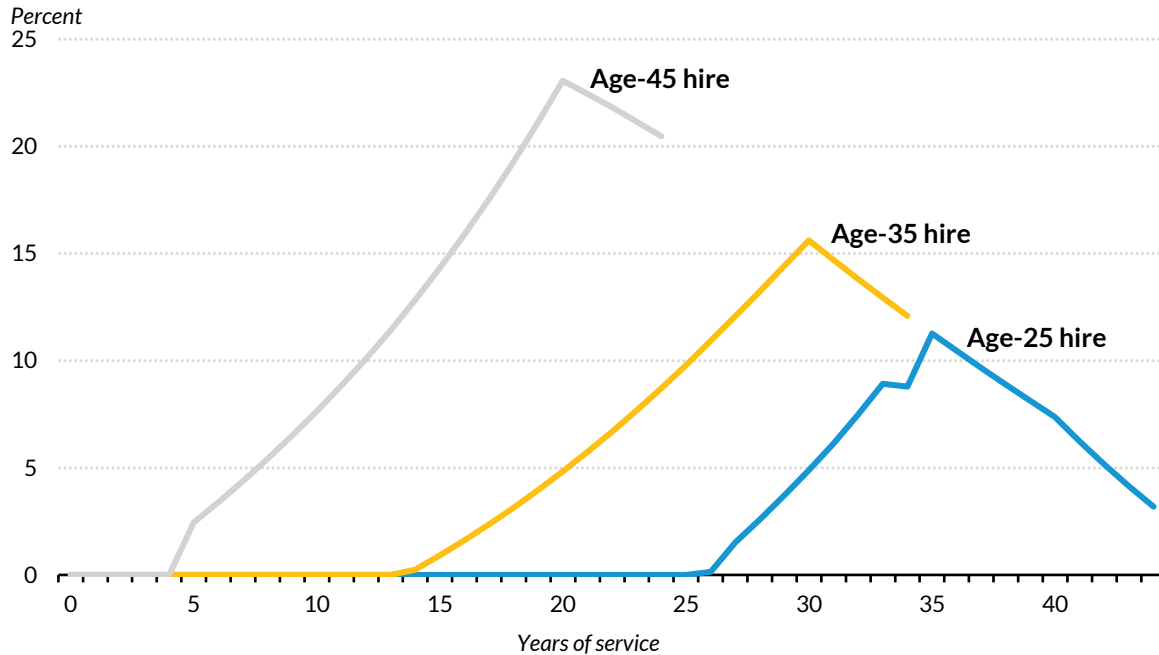
Many teachers who do not spend a full career in Colorado classrooms gain nothing from the retirement system. For teachers hired at age 25, the value of their lifetime benefits net of their required contributions is zero until they complete 26 years of service (figure 3). Teachers hired at age 25 who complete fewer than 26 years of service do not benefit at all from the retirement system, because the contributions they were required to make to the system exceed the value of their future pension benefits. These teachers could receive as much retirement income if they instead withheld their plan contributions, invested them outside the system, and used the proceeds to support their retirement. They subsidize the more generous pension benefits received by the minority of teachers who spend their full career in Colorado classrooms. Separation rates computed by the plan actuaries (Segal Consulting 2019) imply that only 23 percent of male teachers and 17 percent of female teachers hired at age 25 remain employed by the state for at least 26 years.

Teachers hired at older ages do not have to teach as long to benefit from the retirement system. Net lifetime pension benefits become positive after 14 years of service for teachers hired at age 35 and after only 5 years of service for teachers hired at age 45. Older hires gain more from the retirement system than younger hires because older hires do not have to wait as long to obtain their pension.

FIGURE 3

Expected Value of Lifetime Pension Benefits Minus Teacher Contributions, as a Percentage of Lifetime Salary

By years of service and age when hired



Source: Authors' calculations.

Notes: Estimates are for teachers hired on July 1, 2021, at an annual salary of \$40,000. The analysis uses an inflation rate of 2.4 percent and discount rate of 7.25 percent (as specified by the plan trustees) and assumes salaries grow at the average rate assumed by the plan actuaries (Segal Consulting 2019).

Expected lifetime pension benefits net of teacher contributions vary sharply as a share of lifetime salary depending on years of service and age when hired. Among teachers hired at age 25, those who separate after completing 35 years of service receive net lifetime pension benefits equal to 11 percent of their lifetime Colorado teacher salary, compared with 5 percent of lifetime salary for those who complete 30 years of service, 2 percent for those who complete 27 years, and 0 percent for those who complete fewer than 26 years. By contrast, teachers hired at age 45 with 20 years of completed service earn lifetime pension benefits net of their own contributions worth 23 percent of lifetime salary. These swings in the value of pension benefits substantially change the total compensation teachers receive, and there is no evidence that these shifts reflect differences in productivity.

The value of lifetime pension benefits minus teacher contributions to the retirement system decline as a share of lifetime salary once teachers reach a certain seniority level. For teachers hired at age 25, net lifetime pension benefits as a percentage of lifetime salary decline after 35 years of service, falling 8 percentage points, to 3 percent, at 44 years of completed service. For teachers hired at age 45, net lifetime pension benefits as a share of lifetime salary begins falling after 20 years of completed service. These declines create strong retirement incentives for experienced teachers, many of whom remain productive and would remain in the classroom if they were compensated fairly.

Conclusions

Colorado has one of the nation's worst-funded public retirement systems, but recent legislative reforms could improve its financial outlook. Those reforms include innovative provisions to trim retiree benefits and raise employee and employer contributions if the system fails to meet financial milestones, helping the system remain on a path to full funding.

These reforms do not, however, address inequities in the distribution of pension benefits across the teacher workforce. The current system provides substantial retirement benefits to teachers who spend their entire career in Colorado classrooms, but it provides meager benefits to teachers who spend less time employed by the state's school districts. The system also provides much more generous pension benefits to teachers hired at older ages than to those hired at younger ages. Moreover, many newly hired teachers in Colorado will essentially self-finance their pensions by contributing 10 percent of their salary to the state retirement system. For most hires, those contributions will be more than enough to pay for their future pension benefits, and they subsidize the much larger pensions received by the minority of teachers who spend a full career in Colorado school districts. We estimate that Colorado teachers hired at age 25 must work 26 years before they gain anything from the state retirement system, and only 23 percent of male teachers and 17 percent of female teachers hired at age 25 remain employed that long. These inequities are especially important because Colorado teachers are not generally covered by Social Security, so most of their retirement income comes from their teacher pensions.

Various plan changes could distribute benefits more fairly across the workforce. Changing the system's benefit formula would be one way to redistribute benefits. For example, the system could adjust multiplier rates so that short-term workers get a larger share of their final average salary than long-term workers. The system could also index salaries for inflation past a certain number of service years, thereby slowing the rate of growth in the final average salary. These flexible options might appeal more to workers who will not spend a full career in the system.

Other ideas for redistributing benefits among teachers include moving to a 401(k)-type plan, either as a supplement to the current system or as a replacement for it. In a 401(k)-type plan, all participants could receive the same employer contribution relative to their salaries, regardless of age or years of service, and their retirement accounts could continue to grow until they begin collecting benefits, even after they leave public employment.

A better option might be a cash-balance plan, which combines features of a final average salary defined-benefit plan and 401(k)-type defined-contribution plan (Johnson and Uccello 2004). Cash-balance plans establish notional retirement accounts for each plan member. Employers and employees both contribute to the accounts, which are pooled and professionally managed and earn investment returns each year. The plan benefit is expressed as an account balance, but members may always elect to receive their benefit as a lifetime annuity. Cash-balance plans already cover certain government employees in several states, such as Kansas, Kentucky, Nebraska, and Texas.

Notes

¹ Brian Eason, “What PERA’s Bad Year Means for Public Workers, Retirees, and Taxpayers in Colorado, Explained in Charts,” *Colorado Sun*, July 9, 2019; Zachary Christensen, “More Steps Needed to Stabilize Colorado’s State Pension Fund,” *Colorado Politics*, September 18, 2019; Derek Draplin, “Report: Colorado’s State Employee Pension Fund Lost \$1.8 Billion on its Investments Last Year,” *Center Square*, June 24, 2019.

² Senate Bill 2018-200, Colorado General Assembly, June 4, 2018.

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