

# Peaks, Cliffs, & Valleys

The  
peculiar  
incentives of  
teacher  
pensions

**Ms. Baker is a hypothetical Ohio school teacher, age 49 with 24 years of service.**

She's had a good run, but is ready for a change; her heart's not in it anymore, and she wants to go out on a high note. But she has a dilemma regarding her pension. She and her school district have contributed \$422,000 to Ohio's pension trust fund (with interest), yet her pension is worth only \$315,000. If she hangs on for another six years, the pension picture changes dramatically: her pension will be worth close to \$1 million, hundreds of thousands of dollars *more* than the contributions.

Ms. Brooks has the opposite dilemma. She's been teaching in Arkansas since age 25, and at age 53, in light of her exemplary career and continuing enthusiasm, she's just been chosen to be a mentor teacher. The problem is her pension. Every year of additional service *reduces* her pension wealth, despite the fact that she and her district continue to contribute 20 percent of her pay into the fund.

Welcome to the world of teacher pensions.

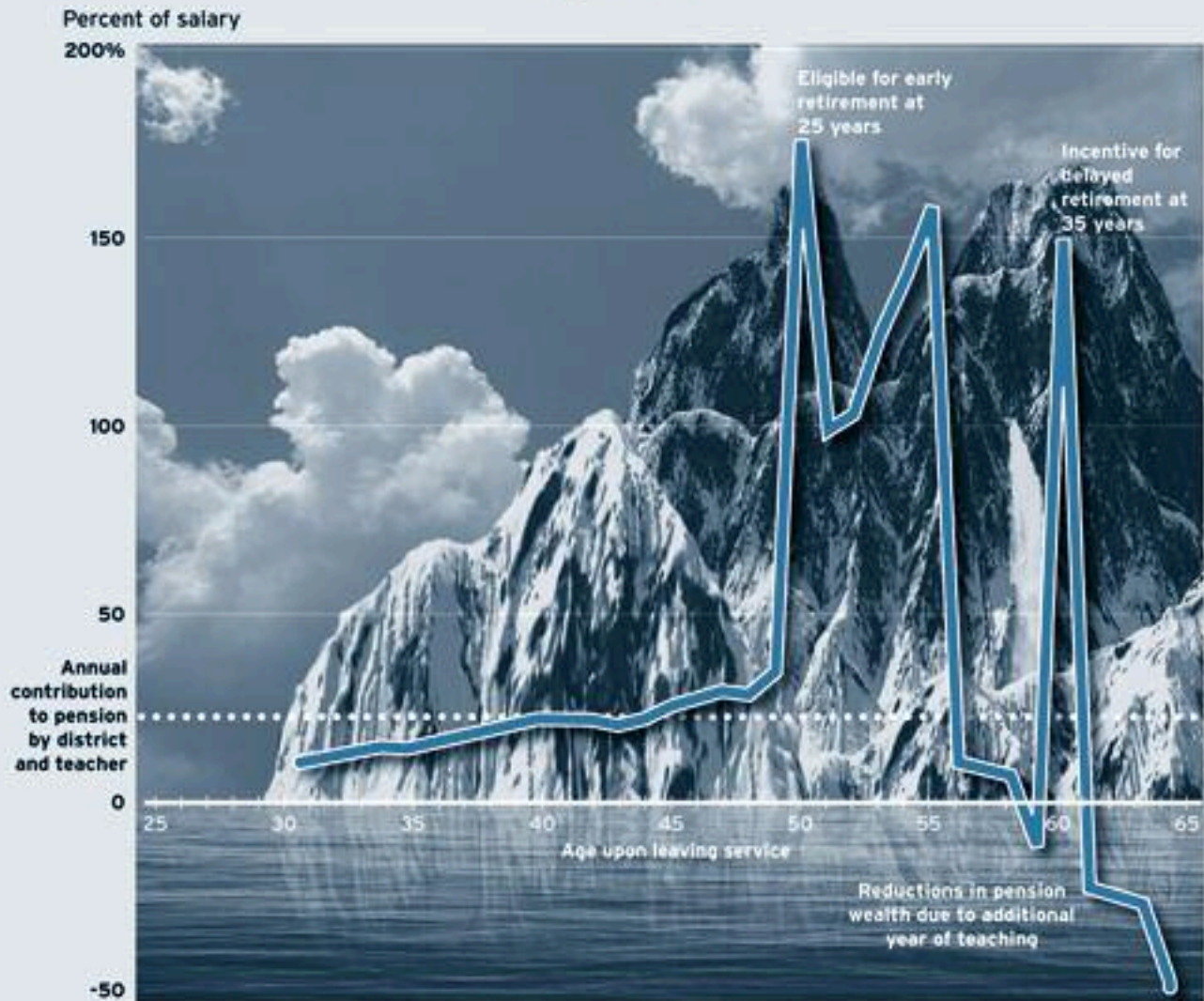
Pensions have long been an important part of compensation for teachers in public schools. However, the incentive structures of teacher pension systems are not widely understood, even though they can have powerful effects on the composition of our teaching force and on public finance.

In our research, we have found that teacher pension systems have two strong incentives—a pull and a push. Teachers typically earn relatively little in the way of pension benefits until they reach their early fifties, when much larger benefits start to accrue. The system therefore pulls teachers to “put in their time” until then, whether or not they are well suited to the profession. Beyond that point, the pension system quickly begins to punish teachers for staying on the job too long, pushing them out the door at a relatively young age, often in their mid-fifties, even if they are still effective teachers. These

BY ROBERT M. COSTRELL AND MICHAEL PODGURSKY

# Increase in Pension Wealth from an Additional Year of Teaching (Various States)

Figure 2a Ohio



Note: Addition to pension wealth is net of interest on prior wealth. Age of entry into teaching is 25. Age of first pension draw for separation at first major spike is 55 (OH), 50 (AR), 53 (MO), 56 (CA) and 55 (MA). Calculations use salary grid for each state's capital city. Pension COLAs are state-specific. Other assumptions as in Figure 1.

Figure 2b Arkansas

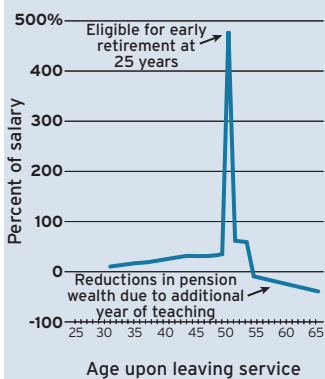


Figure 2c Missouri

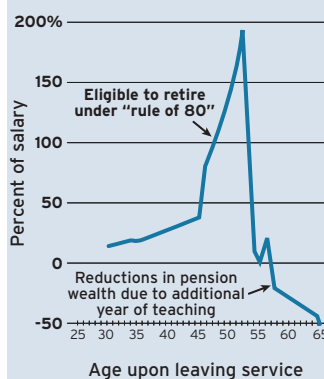


Figure 2d California

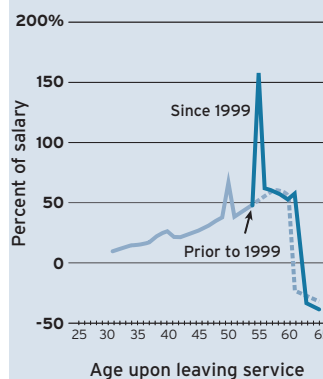


Figure 2e Massachusetts

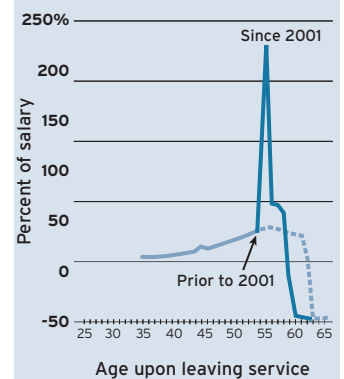


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“pull-push” incentives are embedded in the patterns of pension wealth accumulation over teachers’ careers, patterns that feature dramatic peaks, cliffs, and valleys that can greatly distort work decisions for no compelling public-policy purpose.

Teacher pension systems can also have important implications for recruitment. Pension benefits may seem distant and uncertain for prospective young teachers, who often change jobs. The costs, however, are incurred from the start in contributions from employer and employee that can exceed 20 percent of the teacher’s pay. Many young teachers, who are paying off student loans, starting families, and buying homes, might prefer more of their compensation paid up front rather than diverted into a system from which they may well never benefit.

Finally, the teacher retirement benefit system has major effects on K–12 school finance. Teachers who retire in their mid-fifties are likely to draw pension benefits for at least as many years as they taught. This can be expensive. A teacher retiring at age 55 with a \$50,000 inflation-indexed annual pension has received an annuity valued at over \$1 million. Retiree health insurance can add much more to the bill. To fund these benefits requires large contributions from employees and employers. In Ohio, for example, contributions currently stand at 24 percent of salary (10 percent from the teacher and

14 percent from the district). But even this falls well short of what is needed and pension officials are recommending an increase to 29 percent, to shore up funding for pensions and retiree health benefits.

There is a surprising disconnect between discussions of state teacher pension systems and the larger discussion of retiree benefits in an era of longer life spans and the impending bulge of baby-boom retirees. The retirement age for Social Security is being raised, but there is little discussion of the incentives to retire early from teaching. Just as the benefit overhang of GM, Chrysler, and Ford finally forced changes in their plans, the growing share of K–12 spending consumed by these retirement benefit systems may force similar changes.

As teacher retiree benefit costs spiral upward, it is important to begin asking what effect these systems have on recruitment and retention. In this article, we analyze the incentives embedded in teacher pension systems by examining the pattern of pension wealth accumulation over a teacher’s career.

## Pension Plan Basics

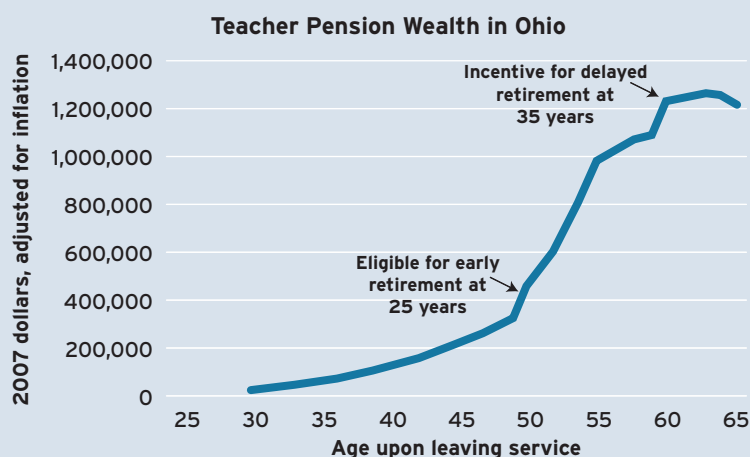
Public school teachers are almost universally covered by traditional defined benefit (DB) pension systems. The employer has an obligation to provide a regular retirement check to employees upon their retirement, based on a legislatively determined formula (see sidebar). The key characteristic of DB systems is that the benefit is not tied to the contributions that individual teachers and employers make to the pension fund. That is what distinguishes DB from defined contribution (DC) plans, known more popularly as 401(k)-type systems.

DB plans were once the norm in both the public and private sectors. In recent decades, private sector employers have shifted in large numbers to DC systems (or closely related systems known as cash balance, discussed below). In DC systems, the employer contributes annually to a retirement account for an employee, and the employee contributes as well. For example, a common arrangement in the private sector is for the employer to match employee contributions up to a certain percentage of the employee’s salary. If the employee quits, he takes the retirement funds with him. The employer is under no obligation to provide a given payment to the employee at the time of retirement. The employee, however, can always choose at retirement to convert the accumulated funds into a stream of payments for life by buying an annuity.

Conversely, when a teacher retires under a DB plan, she is entitled to a stream of payments that

### Scramble to Retirement (Figure 1)

*An Ohio teacher who begins work at age 25 would, after 24 years, have a pension worth \$315,000, but over the next six years it would grow to a total value of \$971,000.*



Note: Age at entry into teaching is 25. Age of first pension draw is 60, until 25th year of service, when it drops to 55. Calculations use the 2006-07 Columbus, Ohio, salary grid and the unisex 2003 mortality table from IRS Revenue Ruling 2002-62 Appendix B. All cells in the salary grid are assumed to grow at 2.5% inflation, the pension cost of living adjustment (COLA) equals 3% (uncompounded), and the interest rate equals 5%.

SOURCE: Authors' calculations

has a lump-sum value (or present value) that can be readily determined using standard actuarial methods. In principle, this pension wealth represents the market value of the associated annuity: it is the size of the 401(k) that would be required to generate the same stream of payments.

Typically, a DB teacher pension plan requires that both teachers and employers make a contribution each year to a pension trust fund, much as in DC plans, but the funding characteristics are very different. Under DC plans, the pension benefits are always fully funded, since the benefit is generated directly by the contributions. Under DB plans, individual benefits are not tied to contributions, so the pension fund as a whole is supposed to accumulate enough money to pay for the accrued liabilities. But this is rarely the case. Many teacher pension systems have large unfunded liabilities (e.g., California \$19.6 billion, Missouri \$5.2b, Ohio \$19.4b, Oklahoma \$7.7b, New Jersey \$10.0b, all in 2006). Matters are made worse by legislatures that juice up the benefit formula when the stock market is up and the value of pension funds is high, only to find the systems sad-

## How Teacher Pensions Work

Once a teacher is vested in a defined benefit system (has worked and contributed for usually five or ten years), she becomes eligible to receive a full pension upon reaching a certain age and/or length of service. Eligibility rules typically allow a teacher to draw a full pension well before age 65, especially if she has been teaching since her midtwenties. Benefits at retirement are usually determined by a formula such as the following:

$$\text{Annual Benefit} = (\text{years of service}) \times (r) \times (\text{final average salary}).$$

Typically, the final average salary is calculated over the last three years, and  $r$  is a percentage that we will call the "replacement factor." In Missouri, teachers earn 2.5 percent for each of the first 30 years of teaching service. For example, Ms. Howard, a Missouri teacher with 30 years' service, would earn 75 percent of the final average salary. So if the final average salary were \$60,000, she would receive:

$$\text{Annual Benefit} = 30 \times .025 \times \$60,000 = \$45,000, \text{ payable for life.}$$

For teachers who separate from service prior to being eligible to receive the pension, the first draw is deferred and the amount of the pension is frozen until that time. Once the pension draw begins, there is typically some form of inflation adjustment.

Figure 1 depicts the pension wealth, in inflation-adjusted dollars, at various ages of separation for a 25-year-old entrant to the Ohio teaching force, the profile of our hypothetical Ms. Baker. Clearly, the accumulation of pension wealth is not smooth and steady, but rises with fits and

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dled with even larger unfunded liabilities when the market turns sour. And as large as these liabilities are, they do not include future costs for retiree health insurance, an issue that is now beginning to appear on education-finance radar screens.

### Incentives to Teach or Retire

The decision to teach or to retire at any given age can have profound financial consequences for the individual teacher. Small, and arbitrary, differences in the timing of retirement can be worth hundreds of thousands of dollars. Teachers cannot afford to be indifferent to these consequences, and many of them surely respond to the incentives embedded in the system. To appreciate these incentives, it is necessary to understand the pattern of a teacher's pension wealth accumulation over the course of her career.

starts after age 50, due to rules of eligibility for early retirement and the like. During her first 24 years in the classroom, she accumulates \$315,000 in pension wealth. However, over the next six years she accumulates more than \$100,000 *per year* and crosses the million-dollar mark at age 56. Pension wealth reaches a peak by her early sixties and then starts to decline.

In this system, those teachers who retire after 25 years or more (age 50 in our example) receive more in benefits than has been contributed to the system on their behalf, while those who leave teaching earlier do not. The inequities here can be quite substantial. If Ms. Baker retires at age 56, her million dollars of pension wealth exceeds the cumulative contributions (with interest) of herself and of her employer by over \$370,000; if she leaves at age 49, she will receive benefits worth \$100,000 *less* than the contributions.



The next set of figures answers the question that is critical for understanding the system's incentives: how much does a teacher's pension wealth change if she works an additional year? This is a measure of *deferred* income received from employment. If, for example, a year of work raises a teacher's pension wealth by \$50,000 (net of interest on the prior year's pension wealth), it is as if she had a 401(k) account that

reflects its history of benefit enhancements; it used to have a single spike at age 60.

### What Causes Pension Peaks, Cliffs, and Valleys?

What features of the benefit formula give rise to such sharp spikes in pension wealth accrual? One might expect that the growth in pension wealth would be fairly steady, as it is in a

## **The primary drivers of pension wealth accrual are changes in the annual annuity payment (determined by the benefit formula) and the number of years the teacher can expect to collect. The latter is often the wild card.**

received \$50,000 in contributions that year. Figures 2a through 2e illustrate graphically the peaks, cliffs, and valleys in pension wealth accrual from each additional year of work over the course of a teacher's career in five state systems.

Consider Ohio, depicted in Figure 2a (which is derived from Figure 1). A teacher who enters service at age 25 (such as Ms. Baker) accrues pension wealth during her early years on the job starting at roughly 10 percent of annual earnings and gradually rising to 34 percent in her 24th year (age 49). Her 25th year of experience yields quite a bonanza: her pension wealth jumps by about 176 percent of her annual earnings. Each of the next five years also yields deferred income that equals or exceeds her current income. Pension wealth accrual drops off dramatically over the years following, with another sharp spike at age 60 (35 years' experience). Beyond age 60, while both she and her employer are continuing to make large contributions to the retirement fund, Ms. Baker's pension wealth actually shrinks, and at an accelerating rate.

All five states display sharp pension spikes. In Arkansas, a particularly sharp spike occurs at age 50 (see Figure 2b). In that year, a teacher's pension wealth increases by almost five times her salary. For a teacher with a \$50,000 salary, it is as if she received a \$250,000 contribution to her 401(k) account. Her pension wealth accrual drops off precipitously the next year, and turns negative by age 54, creating the dilemma of our would-be mentor teacher Ms. Brooks. Similarly, teachers in Missouri, California, and Massachusetts experience pension spikes in their early to mid-fifties, followed by much slower growth and ultimately shrinking pension wealth at various ages (see Figures 2c–2e).

The dotted lines on Figures 2d and 2e indicate the pattern of accrual prior to benefit enhancements enacted by the legislatures in California and Massachusetts. These legislated changes created spikes where none existed. In Arkansas, benefit enhancements over the years have shifted the spike to the left, to earlier retirement. Ohio's multiple-spiked system also

reflects its history of benefit enhancements; it used to have a single spike at age 60. DC plan. After all, both the teacher and employer are making the same contributions year after year. But in a DB plan, pension wealth is not tied to contributions. The primary drivers of pension wealth accrual are changes in the annual annuity payment (determined by the benefit formula) and the number of years the teacher can expect to collect. It is the latter that is often the wild card in these systems.

Spikes in several of these states occur because teachers can start collecting their pension at an earlier age once they have worked a certain number of years. For example, during the first 24 years of teaching (to age 49), Ohio's Ms. Baker had to wait until age 60 to collect her pension. However, her 25th year of teaching (at age 50) allows her to begin collecting pension checks five years earlier, producing a sharp spike in wealth accrual.

Another example is Missouri's "rule of eighty," under which a teacher is eligible to receive a full pension once the sum of age and service equals eighty, rather than the normal retirement age of 60. When our 25-year-old entrant passes age 45, each successive year of service allows her to start receiving her pension one year earlier, resulting in rapid growth in pension wealth for several years (see Figure 2c).

Once a teacher gets past the spike (or spikes), pension wealth accrual turns negative. This is not because her monthly pension check shrinks. In fact, it is growing. Rather, pension wealth falls because once she is at an age to begin collecting without deferral, each year of work requires her to forgo a year of pension, which is never recouped. The monthly payment is not enhanced sufficiently to offset this loss.

At this point in her career, the pension system serves as a twofold tax on earnings, first by the required employee contribution and second by the negative deferred income. Together, these can easily offset much or even all of her salary, in which case her total compensation is little or nothing. If the reduction in pension wealth from working an additional year exceeds the teacher's take-home pay, her total compensation is negative and she is paying for the privilege of teaching.

## Do Teachers Respond to Pension Incentives?

The peaks and valleys of pension wealth accrual create large pull-push incentives. Teachers are pulled to stay on the job until they reap the benefit of the spikes: a few more years of “putting in time” can mean a difference of several hundred thousand dollars. Once a teacher is beyond the spike and pension wealth starts shrinking, the system is effectively pushing her into retirement.

There is ample evidence that such incentives affect behavior. Anecdotal evidence is commonplace of teachers (and others) timing their retirement decisions to the parameters of the benefit formula; pension systems routinely provide online pension calculators to help their members do so. Labor economists have developed more systematic statistical evidence on the incentive effects of retirement benefit systems, particularly those in the Social Security system. There has been much less research specifically on teacher pensions, but that which is available indicates strong incentive effects. In Missouri, for example, teacher labor-force data show that retirement rates spike when the sum of age and experience is around 80—consistent with the incentives embedded in that state’s “rule of eighty” eligibility formula.

## Unintended Consequences: Employment after “Retirement”

Teacher pension systems typically have strong incentives for early retirement built in. Given concerns about teacher shortages and pressures from the No Child Left Behind Act to staff classrooms with qualified teachers, it makes little sense for districts to nudge experienced, credentialed, and effective teachers out the door at such early ages. Not surprisingly, all of these teacher pension systems have provisions that allow educators to continue to teach and collect their pension in certain circumstances (a practice called “double dipping”). These provisions seem to be expanding.

3. Break in employment. Some states allow teachers to return to full-time employment and collect their pension after a specified break in service. In California the required break is 12 months. In Ohio, a retired teacher can return to work the next day, but must wait two months before receiving pension benefits.
4. DROP plans. Many states have implemented Deferred Retirement Option Plans (DROPs). These permit teachers to continue working full time for a specified period of time (up to ten years in Arkansas), during which all or most of their pension check goes into what amounts to an individual retirement account.

Of course, retired educators can resume teaching by crossing a state line or a district boundary to work in a different pension system. For example, Missouri teachers in the state pension system can retire and work full time in the St. Louis or Kansas City systems, or they can cross the border and work in Kansas.

The result of all of these postretirement options is that the decision to “retire” (i.e., collect a retirement check) is not necessarily the same as a decision to quit teaching. Unfortunately, we are aware of no comprehensive national data on this topic. Limited data from a national survey conducted by the U.S. Department of Education suggest that at least 5 percent of the public school teaching workforce is also collecting a teacher pension. A longitudinal study of Missouri teachers found that 12 percent of teachers worked at least one year part time or full time following retirement.

Reemployment provisions such as these are not found in the private sector, where early retirement incentives are usually part of a downsizing effort. In teaching, by contrast, early retirement incentives have a completely different origin, namely legislatively enacted benefit enhancements, typically under heavy union lobbying. Reemployment provisions are often a delayed response to the unintended (if often predictable) problems created by these incentives. In

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Here are examples.

1. Part-time employment. All of the pension systems considered here allow retired teachers who are receiving pension payments to continue to work in covered employment on a part-time basis (without accruing additional benefits).
2. Employment in shortage areas. Many states permit retired educators to teach full time for a specified period of time in “shortage” fields.

other words, these provisions are ad hoc fixes to enhanced pension spikes.

Postretirement employment blurs the distinction between current and deferred compensation. At the very least, this calls into question the meaning of published data on teacher compensation. In addition, as reemployment becomes easier, the incentive to “retire” at or near a pension spike becomes more pronounced, as there is no downside if employment can

## Under new government accounting rules, benefit plans and employers will need to provide annual estimates of health insurance liabilities in their financial statements. First hints at the figures are staggering.

continue. It might also be in the district's interest, if the pension costs are borne by the state. One might expect, therefore, that "retirements" would become even further concentrated at the spikes.

### More Unintended Consequences: Health Insurance

Another consequence of early teacher retirement is a linked demand for retiree health insurance coverage. Since regular Medicare eligibility does not begin until age 65, teachers who retire in their fifties have a gap of many years in coverage. In light of this, many school districts and states have extended health insurance coverage to retirees. Unlike the teacher pension system, payments for retiree health insurance are typically pay-as-you-go (i.e., no employer fund is created to pay for these future liabilities). Under new government accounting rules (GASB 43 and 45), benefit plans and employers will need to begin providing annual estimates of these liabilities in their financial statements. First hints at the figures are staggering. Los Angeles Unified, which provides complete health insurance coverage for all retirees, has an estimated \$5 billion unfunded liability. A recent report by the Cato Institute estimates that the unfunded liabilities of state and local governments under GASB 45 could total \$1.5 trillion. These unfunded liabilities create pressures for higher contribution rates, local tax increases, and spending cuts in other areas.

### Options for Reform

The underlying problem with DB systems is their distortion of retirement incentives, stemming from the broken link between benefits and contributions. DC systems and cash balance (CB) plans restore that link. Many large corporations have switched to DC and CB plans over the last 20 years. Some public entities, including a few teacher pension systems (Ohio's is one), have also started to offer DC or CB-type options in their plans.

CB plans are similar to DC plans in that both systems tie benefits closely to contributions. The main difference is that in a CB plan, the return is guaranteed by the employer (typically at a rate comparable to risk-free Treasury bonds), so the market risk is not borne by the employee. Often the debate over DB vs. DC plans focuses on the issue of risk, rather than the retirement incentives. Since our subject here is retirement incentives, we focus on CB plans, where the issue of market risk does not arise.

The neutrality of CB plans with regard to age of separation can be simply depicted. In the pension wealth accrual graphs, the lines would be horizontal at a percentage given by

the sum of employee and employer contributions (see Figure 2a). The system does not drive teachers to stay to their mid-fifties and then leave. Pension wealth never declines: if a teacher wants to work another year, the account grows by the contributions, plus the investment return. This can then be converted to an annuity. If a teacher works another year, the starting annuity is increased in an actuarially fair manner, since there is one less year of retirement to cover.

Such a retirement-neutral plan leaves the employee much more latitude to decide when to retire or switch careers based on individual preferences (such as Ms. Baker). It also makes it easier for schools to retain effective teachers (such as Ms. Brooks), who might otherwise be driven by the pull-push incentives of pension spikes. This is preferable to the heavy-handed DB formulas, supplemented by makeshift DROP formulas or other reemployment provisions. Finally, it is fiscally more stable when benefits are tied closely to contributions. Unfunded liabilities do not arise so readily, and legislatures have less opportunity to enhance benefits by shifting costs to future generations of taxpayers and teachers.

### Principles for Reform

The time is ripe to consider teacher pension reform, with an eye both to teacher quality and fiscal stability. A new or reworked retirement system should embody several key features: **Neutrality.** Each additional year of work should increase pension wealth in a fairly uniform way. There should be no spikes or cliffs at any particular years of service. Longevity decisions by individuals and their employers should be based on personal priorities and education needs.

**Transparency.** The accrual of benefits should be simple and clear. There should be no opportunities for "gaming" the system.

**Portability.** The private sector has moved toward systems that do not penalize young professionals for changing jobs. Portability may also help attract to teaching an energetic, talented portion of the labor pool, as well as midcareer switchers, such as engineers and other technical workers, who could make valuable math and science teachers.

**Sustainability.** The pension system should be self-funding. Individual benefits should be tied to contributions made by and for the individual teacher.

DC and CB systems satisfy all these conditions far better than the traditional and outdated DB systems. To build and maintain a qualified teacher workforce in today's labor market, states should fundamentally reform their retirement benefit systems.

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