Insufficient:

How State Pension Plans Leave Teachers with Inadequate Retirement Savings

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Introduction

How much do individuals need to save for retirement? Depending on when they start saving and how long they plan to work, many financial experts recommend that workers set aside at least 10 to 15 percent of their annual salaries toward retirement.[1] That total includes both employee and employer contributions, and it assumes that Social Security benefits supplement the worker's personal savings. This generic rule-of-thumb, which has been endorsed by a range of financial advisers, is designed to help workers know how much they need to put aside each year while they're working in order to afford a secure and comfortable retirement.

Many teachers will have to work longer, save more, or rely on other forms of income.

This paper sets out to determine whether public school teachers are meeting these basic retirement savings targets. Unlike in the private sector, where individuals are responsible for making their own financial decisions, nearly all public school teachers are enrolled in state-run pension plans where contribution rates and benefit rules are fixed by state legislators. (Teachers, like other workers, can also supplement their pension plan with additional personal saving.) Half the states have set contribution levels above the minimal target of 10 percent of salaries going toward retirement.[2] But half the states have not set adequate contribution rates, and teachers in those states will have to work longer, save more in their personal accounts, or rely on other forms of income in their retirement years.

However, a superficial look at contribution rates in the public sector does not look deep enough. Ninety percent of public school teachers are enrolled in defined benefit pension plans, which deliver benefits to workers through formulas tied to years of service and salary, not contributions. States set employee and employer contribution rates that apply to all covered workers, but teachers' benefits are based on the pension formula, not how much they contributed into the plan.

In pension plans, unlike in a typical 401(k), the value of the benefits represents an average across all members in the plan. Some members will eventually get much more in return while most will get much less. Prior research has found pension plan benefit formulas disproportionately reward very long-term employees at the expense of short- and medium-term workers.[3] Due to high rates of turnover, many teachers will leave the profession without accumulating adequate retirement benefits for their years of teaching service.[4]

The typical defined benefit pension plan provides a small group of long-serving veterans with adequate benefits, while leaving everyone else short.

In this paper, we define a framework to compare teacher retirement plans against an "adequate" annual retirement savings threshold. We find that the typical defined benefit pension plan provides a small group of long-serving veterans with adequate benefits, while leaving everyone else short. After applying the same test to alternative plan designs, including a 401(k)-style defined contribution plan, a hybrid plan combining a smaller pension and an individual account, and a type of defined benefit called a "cash balance" plan, we find that all of these alternative models outperform the typical plan offered to teachers today in terms of providing the largest possible share of workers with adequate savings. We conclude by offering some suggestions for how states can provide more of their teachers with adequate retirement benefits.

For legal, political, and moral reasons, most pension reform efforts have preserved benefit structures for current workers while enrolling *new* workers in a new system. As such, this paper explores how policymakers might do a better job of providing adequate retirement benefits to *future* teachers. That is, the models presented in this paper are entirely forward-looking, and would not apply to or affect current workers and retirees. They are also merely models, and we would recommend states adapt them to meet the unique needs of their teacher workforce. Though not the subject of this paper, policymakers must also consider how they will deliver on the promises made to current teachers and retirees. The alternative models presented here are designed to be cost-neutral; they would allow states to pay down their existing promises while providing a more secure benefit structure to future employees.

Defining An Adequacy Threshold

The question of how much an individual needs to save for retirement is a function of three main factors: how long the employee plans to work, how much they save each year, and how fast those investments will grow over time. The earlier they start saving, and the longer they plan to work, the lower their investment target can be. Similarly, all things being equal, employees can save less if they are able to grow their investments at a faster rate over time.

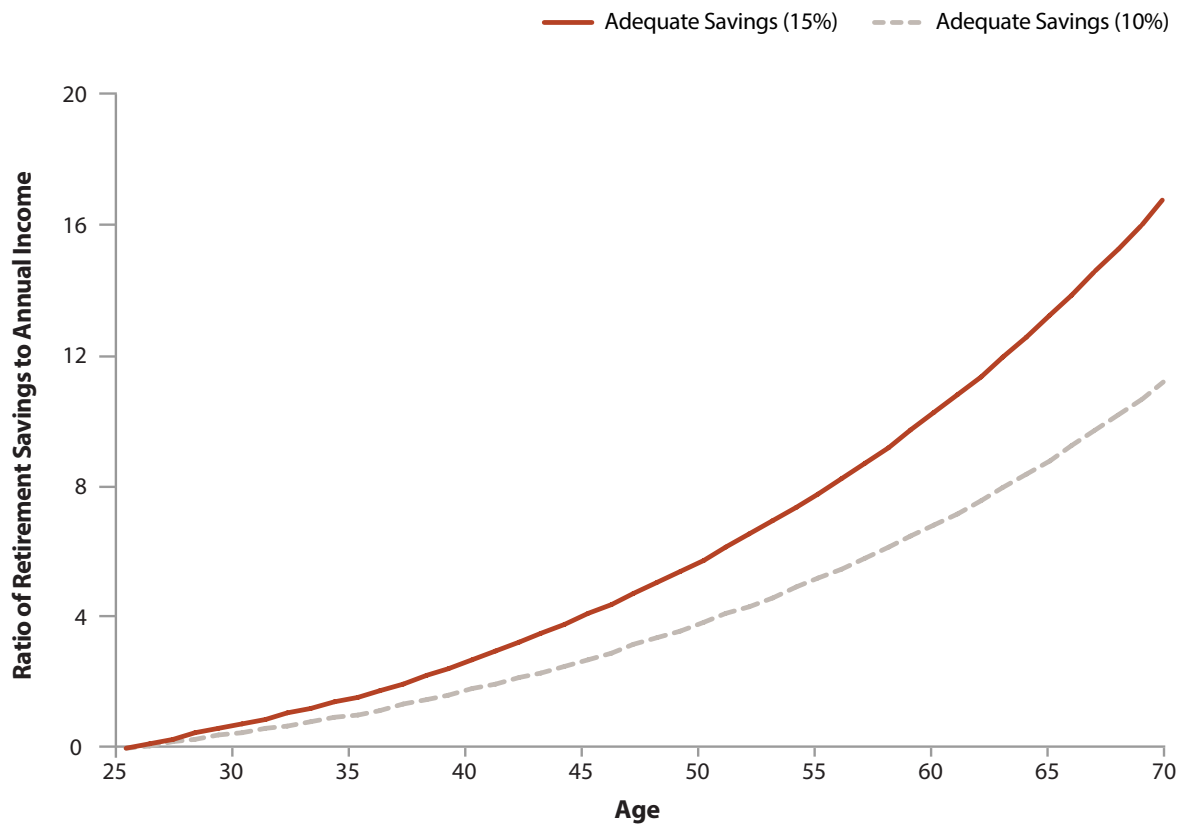
Taking all these factors into account, most experts recommend that individuals save at least 10 to 15 percent of their annual income toward retirement, in addition to Social Security. Besides being easy to remember, those savings rates, grown at a real rate of return of 4 percent, would be sufficient to retire comfortably between the ages of 65 and 70. If workers don't start saving until later ages, those saving targets must be significantly higher in order to compensate for fewer years of saving and compounding.

The 10-15 percent targets help workers establish specific annual savings targets, and they can help workers understand over the longer term whether they're on track to a secure retirement or not. This is important, because retirement experts usually recommend that workers should strive to have enough income in retirement to maintain a similar standard of living. Known as the "replacement rate," retirees are typically able to live comfortably on 60 to 80 percent of their pre-retirement income, mainly because they no longer have to account for the costs of raising children, commuting, and saving for the future.

Lifetime targets help workers decide whether they're making progress toward those replacement rates. For example, someone who starts working at age 25, contributes 10 percent of their salary, and is able to grow their investments by 4 percent a year (in real terms) would surpass one times their annual salary by age 35. If they keep going at the same pace, they would surpass twice their annual salary by age 42, four times their annual salary by age 51, and eight times their annual salary by age 64. Someone saving 15 percent annually would see their assets grow even faster. Assuming the same rate of return, they'd hit one times their annual salary by age 32, two times by age 38, four times by age 45, and eight times by age 56.

Figure 1 below shows what these targets look like over time. The dotted line shows the 10 percent annual target, and the red line shows the 15 percent target.

Figure 1 Adequate Savings Targets Help Workers Understand How Much They Should Have Saved at Various Ages



These are rough targets, and they vary depending on an individual's personal preferences for retirement and how long they would be expected to live. Again, they are meant more as guidelines than as hard-and-fast rules. Still, they provide a rough approximation of adequate savings, and we'll return to these targets in subsequent sections. First, we'll look at how teachers fare in the typical state-run defined benefit pension plan. Then we'll apply the same adequacy targets to alternative retirement plan options to determine whether those types of plans might provide more teachers with adequate retirement benefits.

How Typical Teacher Retirement Plans Work Today

Defined Benefit Pension Plan

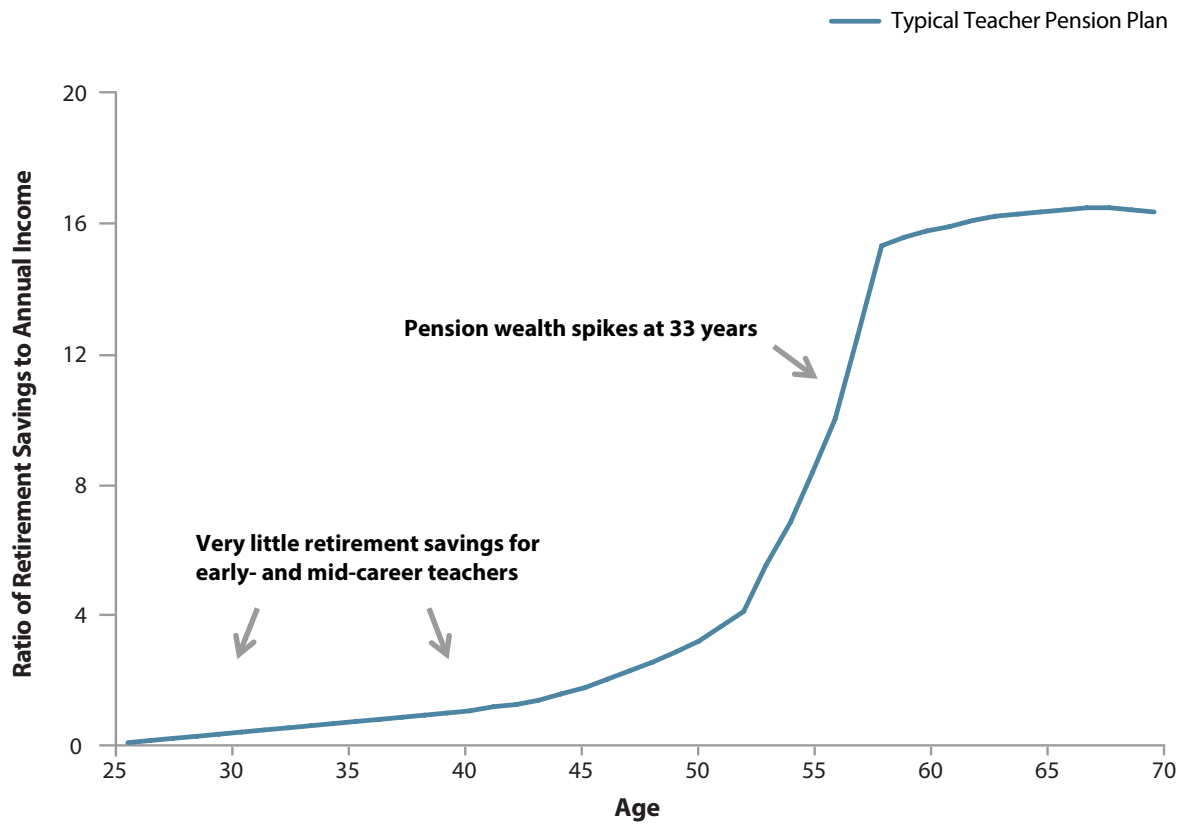
Most teacher pension plans are defined benefit (DB) plans. The state defines the benefit formula and determines the investments and annual contributions necessary to pay for those future benefits. A typical formula consists of a multiplier (usually around 2 percent) that is multiplied by salary and years of service. Most DB plans also include an annual cost-of-living adjustment to help pension payouts keep up with inflation.

Figure 2 depicts how benefits would accrue under a typical defined benefit pension plan offered to new, 25-year-old teachers. The assumptions used to create this graph generally represent the rules in the median state's plan, but please see the Appendix for the full assumptions. While the actual slope of the line would look different for particular states, Figure 2 represents our attempt to create a composite of state-run defined benefit pension plans offered to teachers.

The typical teacher pension plan provides generous retirement for full-career workers, but it does so at the expense of short- and medium-term workers.

As the graph shows, the typical teacher pension plan offers very little retirement savings in the first 20 years of a teacher's career. After that, pension wealth spikes at 33 years of experience. This plan provides generous retirement for full-career workers, but it does so at the expense of short- and medium-term workers.

Figure 2 A Typical Defined Benefit Pension Plan Offers Back-loaded Benefits



Again, the specific patterns will vary by state, but DB plans covering the vast majority of teachers back-load benefits toward the end of the teacher's career. Teachers who qualify and remain will receive a steady stream of income, adjusted for inflation as they age, that is guaranteed to last their entire lifetime. However, as the next section will explore, the typical teacher pension plan provides adequate retirement benefits only to those who remain in one state plan for the bulk of their careers.

Defined Benefit Pension Plans Versus an Adequacy Threshold

From a teacher's perspective, a defined benefit plan carries no investment risk and, if she continues until retirement, she is guaranteed a stream of income afterward. For short- and medium-term teachers, geographically mobile teachers, or career switchers, however, being in a defined benefit plan brings a risk of inadequate savings. If the teacher moves across state lines or changes careers, she will have to either take her contributions with her or wait for a pension. Either way, this translates to inadequate savings by the time of retirement.

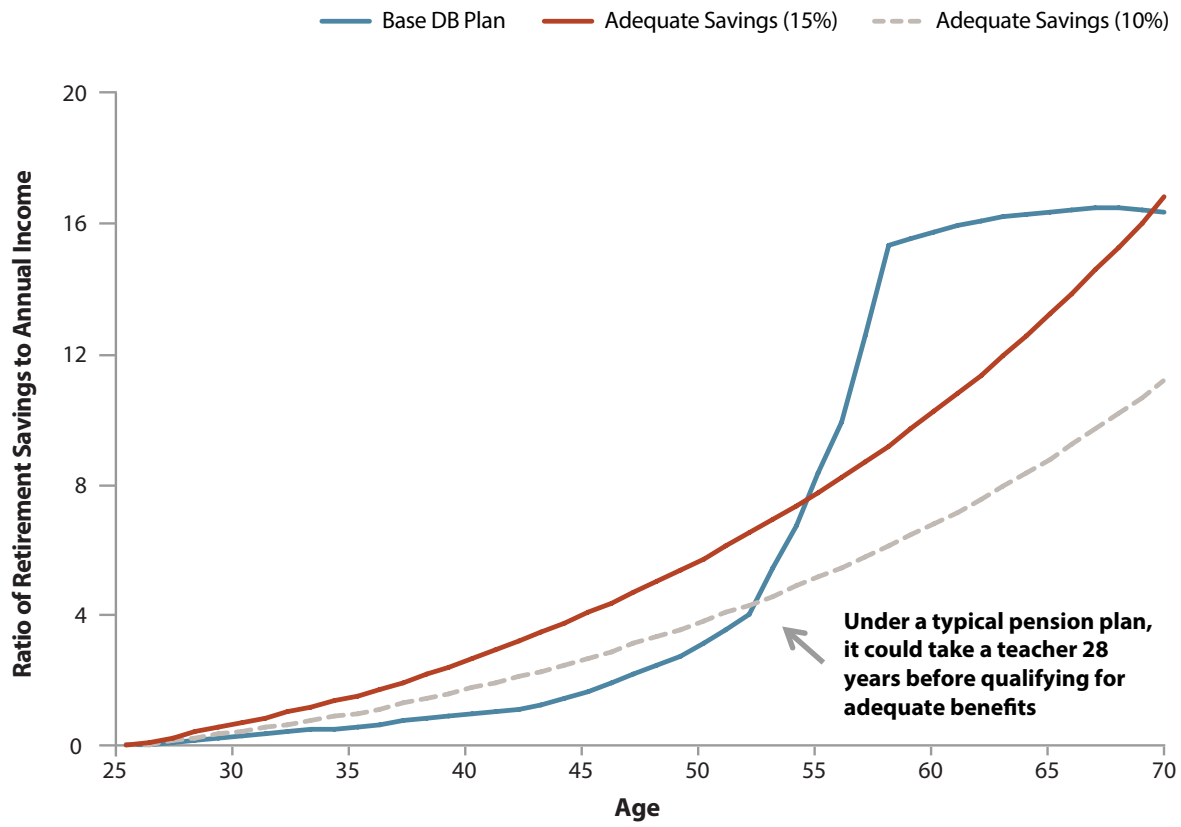
Figure 3 shows the same defined benefit plan model as illustrated in Figure 2 above, compared with the same adequate savings thresholds discussed above. The solid blue line is the same as in Figure 2, and it represents the accumulation of retirement benefits for a teacher who begins her career at age 25. The red and dashed lines represent the adequacy levels recommended by financial experts, the annual savings targets of 10 to 15 percent of salaries. The y-axis is the value of the retirement benefits as a ratio to the current salary. As the graph suggests, for the first 28 years of service, the teacher's total savings fall below even the lower 10 percent adequacy band. If the teacher leaves the pension plan due to relocation, career change, or other reasons, she will be below the level of benefits that most experts recommend. However, if she continues to work, her benefits will accrue rapidly and by age 55 surpass even the upper adequacy band. This is the effect of the back-loaded formula. It requires teachers to remain for very long stretches of time in order to qualify for adequate retirement benefits.

Employers should design retirement plans for workers, not as a retention tool for employers.

This structure does a good job protecting very long-term employees, at the expense of everyone else. Some readers might think retirement plans *should* be designed in this way, to counter against teachers who might otherwise leave mid-career. We think it would be a mistake to look at pension plans this way. Instead, employers should design retirement plans for workers, not as a retention tool for employers. (See Sidebar: How Do Retirement Plans Affect Teacher Retention Decisions?)

Although the plan modeled here is based on the composite of all state-run defined benefit pension plans and state-level results would vary, the adequacy assumptions put forth are meant to be paired with Social Security. But 15 states do not enroll their schoolteachers in Social Security, leaving the teachers in those states especially vulnerable to poorly designed state-run retirement plans.[5] States without Social Security benefits do tend to offer slightly more generous benefits to full-career workers, but their plans are often particularly bad for short- and medium-term workers.

Figure 3 Defined Benefit Pension Plans Are Inadequate for Most Teachers



For teachers with inadequate retirement savings during their years of teaching, they'll need to increase their savings rate later in their career, work longer, rely more on family or governmental support, or live a more modest lifestyle in retirement. The current state-run pension plans are providing comfort and security for a subset of teachers, but they do not do a good job in covering everybody within the system. The following sections delve into potential alternative plan designs to gauge which types of plans would do a better job of providing all teachers with adequate retirement benefits.

Alternative Pension Models

Could states offer more equitable retirement benefits at the same cost? All plans have their advantages and disadvantages, but this section highlights several alternative models and shows how states could provide minimally adequate retirement benefits to a higher share of their teacher workforce.

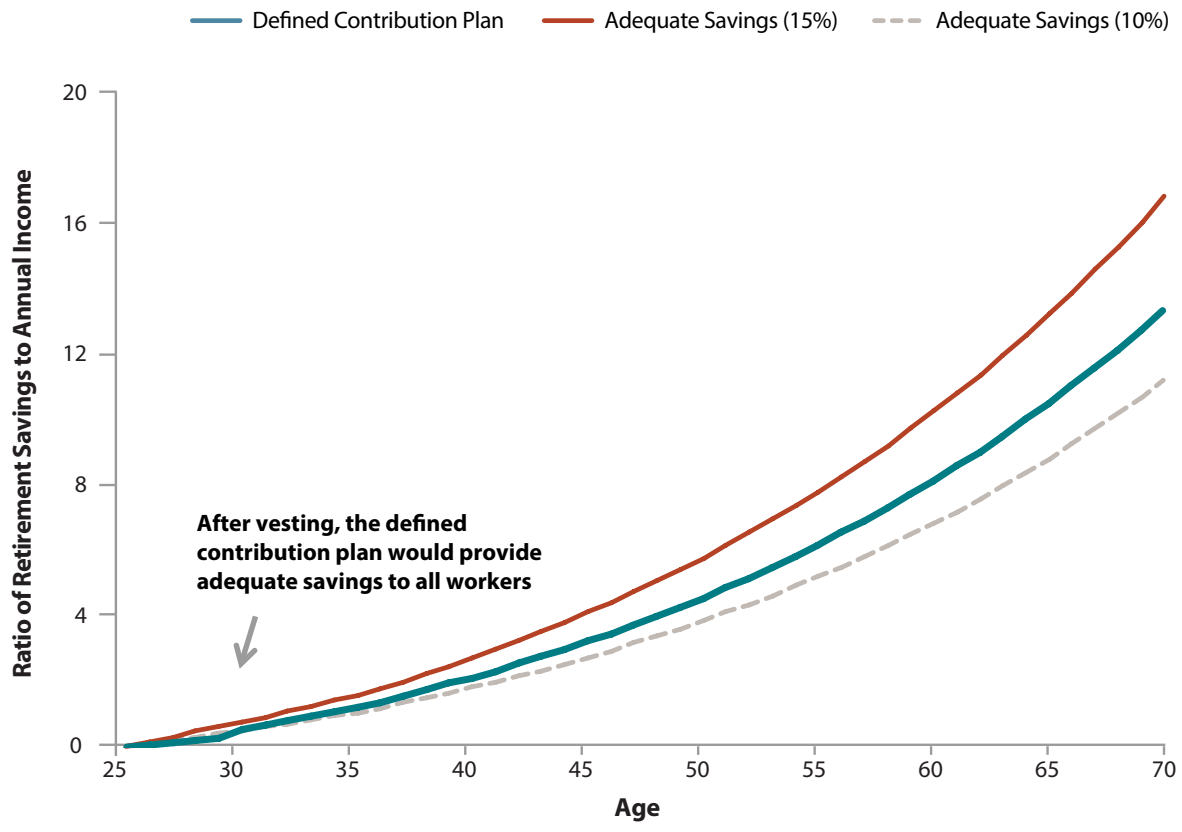
Defined Contribution Plans

One alternative to defined benefit pension plans is much more prevalent in the private sector: defined contribution (DC) plans. Employers determine the percentage of an employee's salary that they will contribute, and the investments go directly into accounts that employees own and control. Unlike a defined benefit plan, defined contribution plans are strictly tied to the contributions into them and any investment earnings. Unlike DB plans, nothing is guaranteed under DC plans.

A standard DC plan in the private sector allows workers to open 401(k) accounts, and employers often match a portion of their employees' contributions. By definition, DC plans cannot be underfunded since the value of the account is directly tied to the contributions and earnings on those contributions. Furthermore, DC plans are portable. If individuals leave the job, the accounts are theirs to take with them.

Figure 4 illustrates how a defined contribution plan could look compared to the same adequate savings targets defined above. The plan modeled here is explicitly designed as a cost-neutral alternative, but see the Appendix for the full assumptions behind the plan. There's an ongoing academic debate about whether asset returns are higher in defined benefit or defined contribution plans.[6] In theory, an individual should take more risk when they have a long investment horizon but become more conservative as they near retirement age, whereas DB plans can maintain an aggressive investment allocation because they have many members who retire at various points in time. In reality, it's not clear that the difference in the plan type results in different investment outcomes. Still, as a concession to this debate, we've chosen a more conservative investment return

Figure 4 A Defined Contribution Plan Would Help More Teachers Reach Adequate Savings Targets



for the DC plan in this example. We've also represented asset accumulation in the DC plan with a solid line, but in reality the accounts would fluctuate up and down with the stock and bond markets. This would give workers some potential for upside if the markets produced strong results, but workers would also bear the burden of any downside risk from market drawdowns.

Based on these assumptions, workers in this DC plan would be below the 10 percent target until they hit five years of service, when they become vested in employer contributions, but after that workers would remain above the minimum threshold for the remainder of their career. However, they would not reach the higher adequacy target without higher contribution rates or higher returns than what we've assumed here. Compared to a defined benefit plan, there is no large spike of benefits at any particular age.

States could mitigate the common problems with 401(k) plans by setting mandatory contribution rates that meet the adequacy targets and by nudging teachers to make smart investment decisions.

To be clear, most private-sector employees in 401(k) plans would fail these adequacy tests. Most employers leave it up to individual employees to decide whether to participate at all and how much to contribute, and employers often cap their own contributions at a modest level (say 3 or 4 percent of salary). That puts additional pressure on individuals to voluntarily choose to save more, despite numerous research studies and anecdotal evidence suggesting that individuals often err on the side of present-day spending over more prudent savings habits.[7] However, were states to choose this model for teachers, they could mitigate these common problems with 401(k) plans by setting mandatory contribution rates that meet the adequacy targets and by nudging teachers to make smart investment decisions through low-cost, age-appropriate index funds.

A shift away from the traditional defined benefit plans would also be favorable for state and local government budgets over the long run, because, unlike DB plans, DC plans do not accumulate unfunded liabilities. In addition to DC plans being the dominant retirement structure in the private sector, a handful of states have adopted defined contribution plans for public-sector workers. As of 2015, Alaska is the only state to have adopted a mandatory defined contribution plan for teachers, but Florida, Michigan, Ohio, South Carolina, and Utah provide defined contribution plans as an option for teachers, and a number of states offer defined contribution plans to other state employees or public college and university employees.[8]

Much of the public pension debate is framed as an either/or between defined benefit pension plans or defined contribution plans. While it makes sense to frame the two types of plans in juxtaposition, there are other good options as well. The next section covers hybrid plans, which combine defined benefit and defined contribution components.

Hybrid Plans

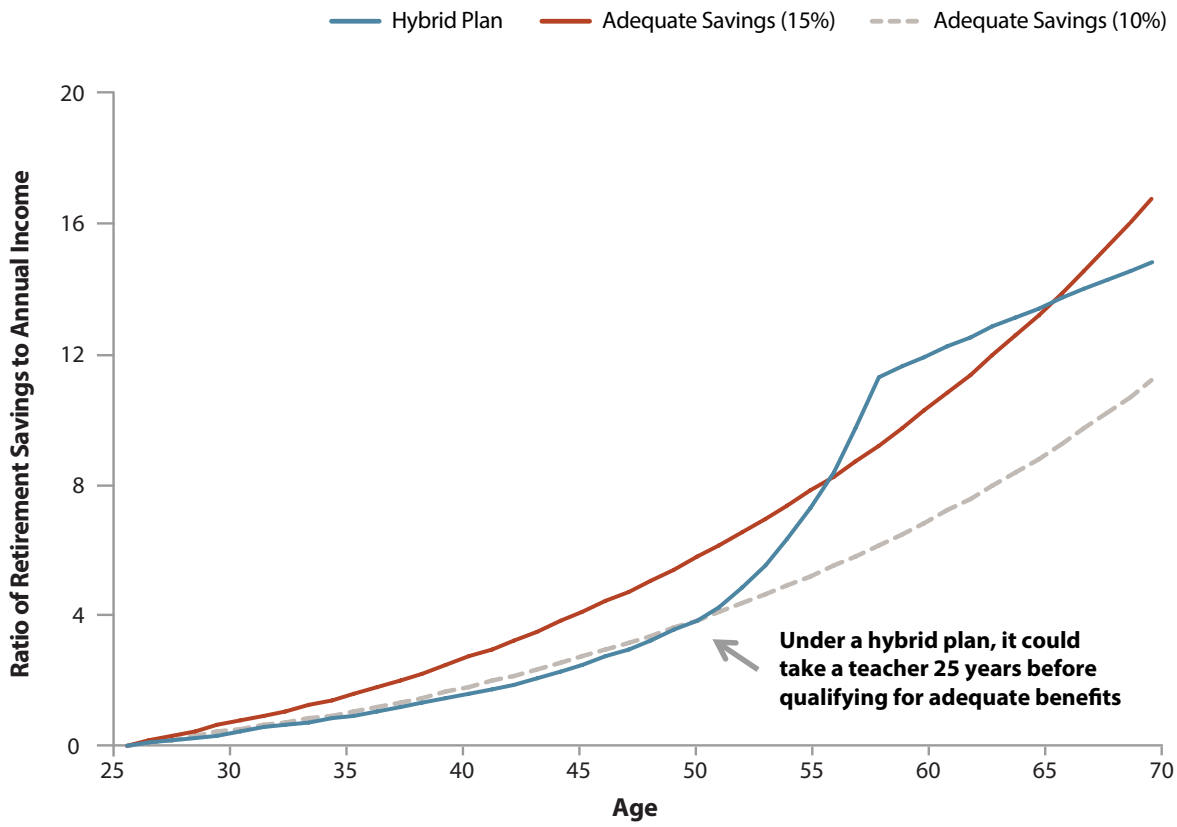
A hybrid plan combines a defined benefit pension component and a 401(k)-style defined contribution account into one plan. Hybrid plans aim to balance the security and back-end guarantee of defined benefit plans with the greater mid-career portability under defined contribution accounts. The term "hybrid" covers a broad swath of DB and DC combinations, and some have bigger or smaller DB or DC components, but their basic goal is to combine the positive features of both into one offering for workers.[9] Currently, five states—Indiana, Oregon, Rhode Island, Tennessee, and Virginia—automatically enroll new teachers into hybrid plans, although the actual mix of DB and DC components varies.

From an employer's perspective, a hybrid plan allows for shared investment risks, because it typically features lower promises in the DB component, as compared to a standalone DB plan. However, hybrid plans also carry the same downsides as DB and DC plans, albeit to a lesser extent. The DB component in hybrid plans could still accrue unfunded liabilities, and workers still need to make good decisions with their DC accounts.

Compared to pure DB plans, hybrid plans tend to do a slightly better job of meeting the needs of short-, medium-, and long-term teachers. On the other hand, hybrid plans are still subject to back-loading and can still leave too many teachers without adequate benefits.

Figure 5 illustrates a similar comparison as above, but for a hypothetical hybrid plan that combines a smaller defined benefit pension (exactly half of the one featured in Figures 2 and 3) with a smaller defined contribution account (half of the one featured in Figure 4). Under this combo plan, a teacher starting at age 25 would be below the 10 percent adequate savings target for her first 24 years of service. This is slightly earlier than the pure DB plan, and the hybrid plan would put more workers closer to the 10 percent target than the pure DB plan alone. Still, the hybrid plan imposes a long period of time for teachers to wait to acquire adequate retirement benefits, and our estimates suggest that about three-quarters of teachers in the hybrid plan would leave without adequate

Figure 5 Hybrid Plans Capture Strengths and Weaknesses of DB and DC Plans



retirement savings. After that point, the combined benefits would accelerate as the back-loaded pension plan benefits kick in more fully. As with the defined benefit plan, some share of long-serving veterans would surpass the more generous targets. The ultimate peak would not be as high as under the pure DB plan, but teachers in hybrid plans are trading a bit more front-end retirement security for lower peak benefits.

Guaranteed Return (Cash Balance) Plans

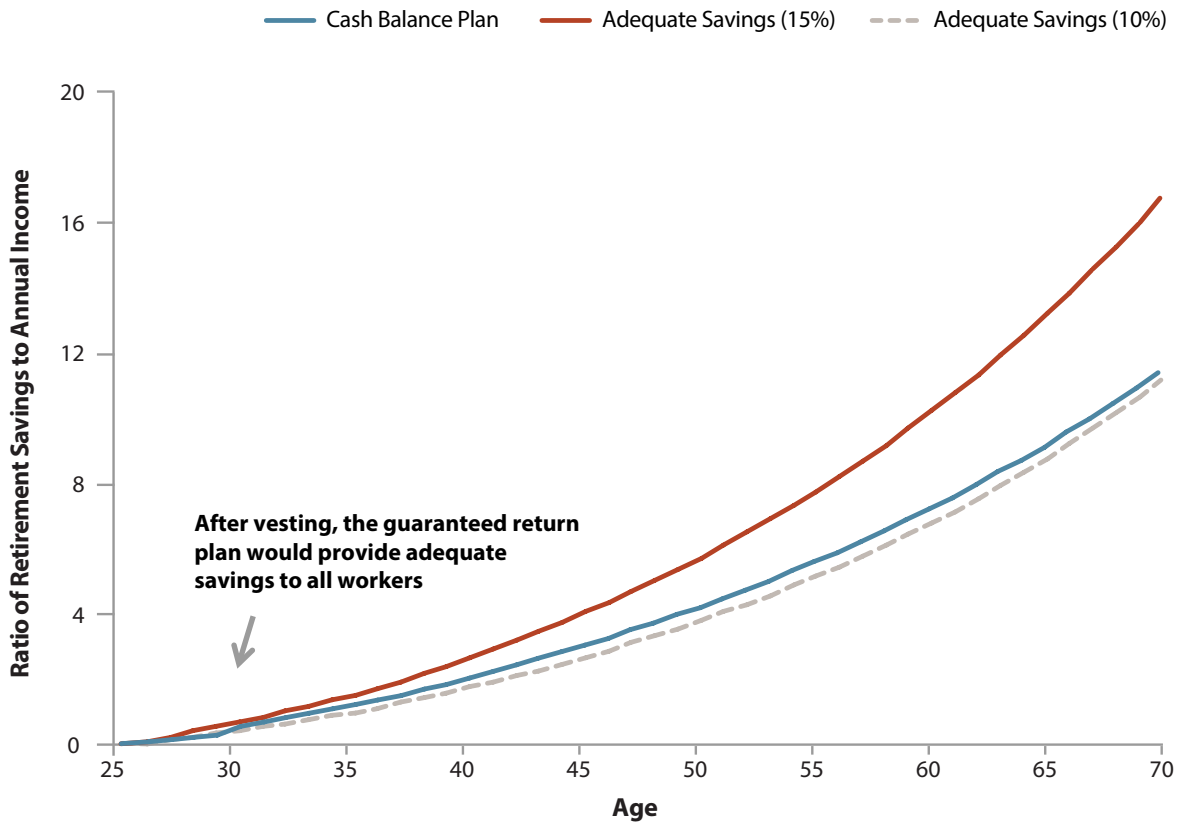
Guaranteed return plans are legally considered to be a type of defined benefit plan called a cash balance (CB) plan, but instead of basing benefits on a formula, employees are guaranteed a rate of return on their investments. Unlike a traditional defined benefit plan, this structure offers employees a smoother benefit accrual pattern that does not penalize workers for mobility. Under CB plans, both employers and employees contribute to accounts held in the name of the employees. However, employers guarantee a rate of return on those contributions, and thus employers hold all the investment risks on behalf of employees.

From an employer's perspective, one of the pros for a cash balance plan is a more limited investment risk, mainly because CB plans typically assume more modest investment returns than are commonly used by most traditional DB plans. Cash balance plans also do not create incentives around any predetermined retirement age, which could be good or bad depending on the employer's goals. For teachers, cash balance plans offer more portability and transparency, since the accounts are defined annually and are purely a function of investments and return rates. However, unlike DC plans, a worker's returns under CB plans are guaranteed, albeit with lower investment returns.

CB plans are increasingly common in the private sector, with millions of members nationwide.[10] In the public sector, Nebraska has been enrolling all new state workers hired since 2005 into a CB plan, and Kansas has been enrolling its teachers hired after 2015 into one.

Figure 6 below models out a sample guaranteed return CB plan. Like the prior charts, it shows how benefits would accumulate for a new, 25-year-old female teacher enrolled in a cost-neutral cash balance plan. The solid blue line shows that the CB plan would deliver steady increases throughout the teacher's years of service. After she vests at five years, she would be above the 10 percent savings for the remainder of her career. Although this plan is equivalent in cost to the prior plans, the CB plan modeled here assumes a lower rate of return pegged to the plan's actual return. There are a number of ways to design CB plans and select the investment return rate, such as setting one predetermined guarantee, allowing the rate to float based on actual market returns, or some combination. Regardless of the specific model chosen, those guarantees are typically more conservative and generally protect workers from any losses. For the plan modeled in the graph below, we assumed workers received an investment return equivalent to 85 percent of what the plan actually earned over a 10-year time period (assumed to be 7.5 percent, just like in the DB plan above).

Figure 6 Guaranteed Return (Cash Balance) Plans Offer Predictability and Portability, but Moderate Investment Returns Cap Their Upside



Unlike the DC plan, cash balance plans provide at least a minimum guaranteed rate of return, but that guarantee results in a lower upside for employees. The CB approach may appeal to more risk-averse investors, but it is a more conservative approach and leads to lower returns over time.

How Do Retirement Plans Affect Teacher Retention Decisions?

Employers might view retirement plans as a tool to shape their workforce, by recruiting and retaining high-quality employees. While this paper is primarily focused on workers and whether they accumulate sufficient retirement assets, employers may also be interested in how changes to retirement plans might affect recruitment and retention.

Whether a retirement plan affects recruitment is hard to pin down, because it's a question about the behavior of *potential* teachers. But a recent study from Matthew Kraft, Eric Brunner, Shaun Dougherty, and David Schwegman on teacher accountability reforms and the supply of new teachers shines at least a partial light on this issue.[11] One of the variables Kraft et al. included was the employee contribution rate into state pension plans. The authors did not look at other pension reforms going on at the same time, but employee contribution rates should be one of the most salient for workers. And yet they did not find employee contribution rates had an effect on the supply of new teachers.

There are two more issues to consider when thinking about whether teacher candidates will change their behavior in response to changes in retirement plan structures. The first is based on location. The vast majority of teachers are enrolled in *statewide* retirement plans, which means that school districts aren't competing for teaching talent with other districts in their state *on the basis of retirement benefits*. If there's a change in the retirement plan, it affects the entire state. For a change in retirement plan to affect the supply of new teachers in a given state, those would-be teachers would have to cross state lines or give up on their chosen profession entirely. Public schools are also not competing with private schools on retirement, because private schools tend to offer retirement benefits that are more comparable to other private-sector employers.

The second reason is complexity. Even if would-be teachers valued the *structure* of a defined benefit pension plan, they would have to be exceptionally well-versed in financial modeling to compare different plans or assess all the variables that might determine their ultimate benefit. Pension plans pay actuaries to run these numbers for them, and unlike in a 401(k) plan where a worker can easily understand and compare employer contribution rates, the pension plans offered to most public school teachers are harder to quantify and evaluate.

Once teachers enter the profession, pensions don't seem to have much effect on early- and mid-career behavior. When we looked at state assumptions on worker turnover, we discovered that no state assumes teachers will change their behavior in order to qualify for a pension benefit.[12] New teachers don't seem to stick around just for a pension. At the back end, there is evidence of a "pull" effect as teachers approach normal retirement age, the age at which they can begin collecting an unreduced pension benefit. Veteran teachers are aware of the pension system and will stick it out a few more years to hit their milestone.[13] But this effect seems to occur quite late in a teacher's career, and few teachers make it to that point.

After teachers reach normal retirement age, there's a large "push" effect that nudges them out of the classroom and into retirement. All told, pensions seem to have a mild retention effect, but mainly on late-career veterans, and they also push veteran teachers out of the classroom at relatively young ages. On net, switching to a different type of retirement plan is likely to have only a limited effect on teacher retention. For example, when Washington state switched to a hybrid plan, it saw no change in teacher retention rates.[14]

That said, states recognizing that pension plans are not an effective tool to shape their teacher workforce doesn't mean state legislators should eliminate all retirement benefits. On the contrary, acknowledging that fact would free up policymakers to focus on the question of whether all workers are on a path to a secure retirement. Ultimately, retirement plans should be designed for the workers in the plan, not their employers.

How Many Teachers Receive Adequate Benefits Under Various Plan Designs?

Every type of retirement plan carries trade-offs in terms of how benefits are awarded to workers and who wins and who loses.

As the graphs above illustrate, each type of plan carries trade-offs in terms of how benefits are awarded to workers and who wins and who loses under each scenario. To quantify the extent of those winners and losers, we calculated how many teachers would receive adequate benefits under each of the plans modeled above. To estimate how many teachers would reach various thresholds, we looked to state actuarial assumptions. Every state pension plan publishes turnover assumptions that it uses to estimate how much it needs to contribute today to pay benefits in the future. Although each state has slightly different assumptions based on their unique workforce, we looked at composite results across all the states and used the median state's results in order to estimate how teachers would fare in a typical state.[15] Table 1 shows our results.

As the table below illustrates, 81 percent of new, young teachers in the typical DB pension plan fail to qualify for adequate retirement benefits. Because of the rapid acceleration of benefits under the DB plan, very few teachers (only about 1 percent of this cohort) would fall right in the middle of the adequacy targets, whereas about one in five qualify for benefits that surpass experts' recommendations for adequate retirement saving. Those teachers will eventually qualify for a generous retirement benefit, but they'll have to make it through years of lower salaries first.

Table 1 Percentage of Teachers Reaching Adequate Savings Targets, By Plan Type

	Typical Defined Benefit Teacher Pension Plan	Cost-neutral Defined Contribution Plan	Cost-neutral Hybrid Plan	Cost-neutral Cash Balance Plan
Percentage of Teachers With Inadequate Savings (annual savings below 10% of salary)	81%	48%	78%	48%
Percentage of Teachers With Minimally Adequate Savings (annual savings of 10-15% of salary)	1%	52%	9%	52%
Percentage of Teachers With More-Than-Adequate Retirement Savings (15% of salary)	19%	0%	14%	0%

Note: Totals may not sum to 100 due to rounding. The percentage of teachers meeting the adequacy thresholds is based on the median turnover assumption from all states. "Teachers" in this context refers to new, 25-year-old female teachers. The results would be identical for employees who begin teaching at different ages under the defined contribution and cash balance plans, which are not tied to the age of the employee. Benefits under a DB plan are tied to age, but the general patterns hold even for workers who begin at older ages. Under the DB plan, 64 percent of incoming 40-year-olds would fall below the minimal adequate savings threshold, the percentage of teachers with minimally adequate savings would rise to 8 percent, and the percent reaching more-than-adequate savings levels would rise to 28 percent. Males tend to have higher turnover rates and lower longevity, so all else equal their results would be even worse under the DB plan.

In contrast, the cost-neutral defined contribution plan and cash balance plans both outperform in terms of providing the most teachers with adequate retirement benefits. Based on the plans modeled above, about half of new teachers would qualify for adequate retirement benefits under these alternative plans. This may seem low, but even the DC plan doesn't meet the adequate savings target until the employer contribution kicks in at the five-year vesting mark. Since early-career teachers have the highest turnover rates, the five-year vesting period prevents many incoming teachers from accumulating much in the way of retirement benefits.

If, however, we dropped the vesting period on the defined contribution or cash balance plans and kept the same contribution rates, all teachers would qualify for adequate benefits. Or, if state legislators balked at the cost of that policy change, they could still help teachers reach the threshold by setting the default employee contribution rate at least at the 10 percent mark. They could allow teachers to lower that contribution if they wanted to, but if a higher

default rate were set, many teachers would choose to stick with that rate from inertia and the inconvenience of switching. Under that route, states would help more teachers get closer to the more comfortable 15 percent threshold after they reached the five-year vesting mark.

If states want to provide all teachers with adequate retirement benefits, they'll need to consider more systemic changes than making tweaks to their existing defined benefit plans.

However, there is no comparable tweak that could be made to improve outcomes under the pure DB or hybrid plans. Both of those plans are so back-loaded that moving to immediate vesting would not bring any additional teachers up to the minimal adequacy threshold. That's not to say it would be a bad policy necessarily—dropping the vesting period in DB plans would be especially valuable to workers who begin their careers at older ages—but the benefit levels themselves would not change enough to push anyone over the adequacy threshold.

In sum, if states want to provide all teachers with adequate retirement benefits, they'll need to consider more systemic changes than making tweaks to their existing defined benefit plans. The next section wraps up and outlines a vision for how states should balance these trade-offs and move forward.

Moving Forward

Nearly every state has made changes to their pension plans over the years. Unfortunately, most of those changes have been driven by cost pressures, rather than the motivation to provide all workers with adequate retirement benefits. In good times, for instance during the late 1990s stock market boom, states tended to enhance their DB plans by increasing the plan multiplier or reducing the normal retirement age. These provisions mainly improved back-end benefits. During bad times, however, like in the wake of the 2007-09 Great Recession, states lengthened vesting periods, increased contribution rates, and cut benefit provisions for new workers. All of these changes made retirement benefits for new workers much worse.[16] As those teachers age into or leave the profession, fewer of them will qualify for adequate retirement benefits than their predecessors did.

There are only two ways states can get out of this box. One option would be for states to make significant reforms to their existing DB plans. By "significant," we mean reforms that dramatically change the way benefits are calculated. For instance, right now states calculate benefits on a worker's final average salary *in the year in which they were earned*. In contrast, Social Security automatically bases its payouts on inflation-adjusted salaries. If states were to move in this direction, they would substantially reduce the back-loaded nature of their plans. States could also be more deliberate about building in progressive elements that awarded flat benefit amounts based on years of service rather than salaries, which could also reduce the extent of back-loading in the current plans.

If those options sound daunting, a simpler option would be to select an entirely new plan design for new workers, such as a hybrid, cash balance, or defined contribution plan. These categories are not distinct, and states could design their plans according to their unique teacher workforce. For example, private-sector 401(k) plans have historically suffered from low participation rates, low contribution rates, and poor investment allocations. But in recent years more employers have set their default options to "nudge" workers to make smart decisions, and those have been extremely successful at getting more workers to participate, contribute at sufficient levels, and take age-appropriate risks in their investments.[17]

Similarly, the defined contribution plans offered to public-sector workers, especially the ones offered to employees in state government roles and at public colleges and universities, typically avoid these problems. Those plans typically feature mandatory participation, high contribution rates, and a limited list of low-cost, age-appropriate investment options. If state legislators were to adopt DC plans for teachers, they should learn from these lessons.

States should set the default option as the plan that provides the greatest number of teachers with adequate retirement benefits.

At the very least, states could allow teachers to make a choice among multiple plans. This would require states to create educational materials and set a default choice, since many workers will fail to make an affirmative decision and automatically default into the suggested plan. As such, states should set the default option as the plan that provides the greatest number of teachers with adequate retirement benefits. For example, since 2002, Florida public school teachers have been given the option to choose between a defined benefit or a defined contribution plan. Originally the default choice was a defined benefit plan, but the state recognized that most teachers would be better off in the defined contribution plan and in 2017 changed the default to the more portable DC plan.[18]

As we hope this report makes clear, there is no one-plan-fits-all model that would apply in all states. However, we recommend that all state retirement plans contain certain features to ensure sufficient savings for the greatest number of teachers. These features include account portability, so teachers can take their savings across state lines; shorter vesting periods, so teachers begin earning a benefit sooner; and Social Security expansion, so that all teachers can at least rely on the portable, progressive safety net offered by Social Security.

At a minimum, state legislators should aim to provide all workers with adequate retirement benefits, regardless of how long they work. To make sure they're accomplishing that goal, states should run similar estimates as to what we've provided here for their particular state plan and their unique teacher workforce, and tailor their benefits accordingly.

Appendix: Model Assumptions

	Defined Benefit (DB)	Adequate Savings (10%)	Adequate Savings (15%)	Defined Contribution (DC)	Cash Balance (CB)	Hybrid
Starting Salary	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000
Salary Growth Rate	3% real	3% real	3% real	3% real	3% real	3% real
Employee Contributions	7.5%[19]	5%	10%	7.5%	7.5%	7.5% (split evenly between DB and DC)
Employer Contributions for Benefits	4.5%[20]	5%	5%	4.5%	4.5%	4.5% (split evenly between DB and DC)
Investment Return Assumption	7.5%[21]	7%	7%	7%	6.375%[22]	DB: 7.5%; DC: 7%
Inflation Assumption	3%[23]	3%	3%	3%	3%	3%
Vesting Period	5 years	N/A	N/A	5 years	5 years	5 years for both DB and DC
Multiplier	2%	N/A	N/A	N/A	N/A	DB: 1%;
Final Average Salary	Highest 3 years	N/A	N/A	N/A	N/A	DB: Highest 3 years; DC: N/A
Normal Retirement Age	Age 65 with 5 years of service; Any age where service + age > 90	N/A	N/A	N/A	N/A	DB: Age 65 w/ 5 years of service; Any age where service + age > 90; DC: N/A
COLA	2.2%[24]	N/A	N/A	N/A	N/A	DB: 2.2%; DC: N/A

Endnotes

[1] As See, for example, Alicia H. Munnell, Francesca Golub-Sass, and Anthony Webb, "How Much to Save for a Secure Retirement," research brief, Center for Retirement Research at Boston College, November 2011, http://crr.bc.edu/wp-content/uploads/2011/11/IB_11-13-508.pdf, and "How Much Do I Need to Retire?," Fidelity Viewpoints, August 21, 2018, https://www.fidelity.com/viewpoints/retirement/how-much-money-do-i-need-to-retire.

[2] Most states have to make additional contributions to pay down unfunded liabilities, called the "amortization cost." Although the amortization costs are large, this paper focuses on what actuaries call the "normal cost" of benefits, which measure the value of the actual benefits delivered to workers.

[3] See, for example: Robert Costrell and Michael Podgursky, (2009). "Peaks, Cliffs, and Valleys: The Peculiar Incentives in Teacher Retirement Systems and Their Consequences for School Staffing," *Education Finance and Policy* 4, no. 2 (2009): 175–211; Martin Lueken, "(No) Money in the Bank: Which Retirement Systems Penalize New Teachers?," Thomas B. Fordham Institute, Washington, DC, 2017; Josh McGee and Marcus Winters, *Better Pay, Fairer Pensions III. The Impact of Cash-Balance Pensions on Teacher Retention and Quality: Results of a Simulation*, Report 15 (New York: Manhattan Institute, 2016); Ben Backes et al. (2016). "Benefit or Burden? On the Intergenerational Inequity of Teacher Pension Plans," *Educational Researcher* 45, no. 6 (2016): 367–377.

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[7] See, for example: "National Retirement Risk Index," Center for Retirement Research at Boston College, http://crr.bc.edu/special-projects/national-retirement-risk-index/.

[8] See Kathryn Doherty, Sandi Jacobs, and Martin Lueken, *Doing the Math on Teacher Pensions: How to Protect Teachers and Taxpayers* (Washington, DC: National Council on Teacher Quality, January 2015).

[9] See "What are Hybrid Retirement Plans? A Quick-Reference Guide," Center for State & Local Government Excellence, January 2011.

[10] For example, the Kravitz company used Department of Labor data to estimate there were 11.8 million workers covered by a cash balance plan as of 2016. See: 2018 *National Cash Balance Research Report, 10th Annual Edition* (Los Angeles: Kravitz, 2018), https://www.cashbalancedesign.com/wp-content/uploads/2018/08/NationalCashBalanceResearchReport2018.pdf.

[11] Matthew Kraft et al., "Teacher Accountability Reforms and the Supply of New Teachers," January 2018, https://scholar.harvard.edu/files/mkraft/files/kraft_et_al._2018_teacher_accountability_reforms.pdf.

[12] Chad Aldeman and Kelly Robson, "Why Most Teachers Get a Bad Deal on Pensions," *Education Next*, May 16, 2017, http://educationnext.org/why-most-teachers-get-bad-deal-pensions-state-plans-winners-losers/.

[13] See, for example: Alan Gustman and Thomas Steinmeier, *Pension Incentives and Job Mobility* (Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1995), https://research.upjohn.org/up_press/61/, Cory Koedel and P. Brett Xiang, "Pension Enhancements and the Retention of Public Employees," *ILR Review* 70, no. 2 (2016): 519–551, https://journals.sagepub.com/doi/abs/10.1177/0019793916650452, and Dongwoo Kim, "Worker Retirement Responses to Pension Incentives: Do They Respond to Pension Wealth?," October 13, 2016, http://www.sole-jole.org/17132.pdf.

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[16] See: Leslie Kan and Chad Aldeman, "Eating Their Young," brief, TeacherPensions.org, Bellwether Education Partners, July 7, 2015, https://www.teacherpensions.org/resource/eating-their-young and Jean-Pierre Aubry and Caroline Crawford, "State and Local Pension Reform Since the Financial Crisis," brief, Center for Retirement Research at Boston College, January 2017, http://crr.bc.edu/briefs/state-and-local-pension-reform-since-the-financial-crisis/.

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[19] Median employee contribution as reported in NCTQ's "Lifting the Fog" report.

[20] Median normal cost of benefits as reported in NCTQ's "Lifting the Fog" report.

[21] Median assumption in FY2016 of 152 large plans with available data from: Public Plans Data, http://publicplansdata.org/public-plans-database/browse-data/.

[22] Based on 85 percent of the DB assumed rate of return of 7.5 percent.

[23] Median assumption in FY2016 of 152 large plans with available data from: Public Plans Data, http://publicplansdata.org/public-plans-database/browse-data/.

[24] CPI as of December 13, 2017: "Consumer Price Index Summary," Bureau of Labor Statistics, US Department of Labor, November 14, 2018, https://www.bls.gov/news.release/cpi.nro.htm.

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