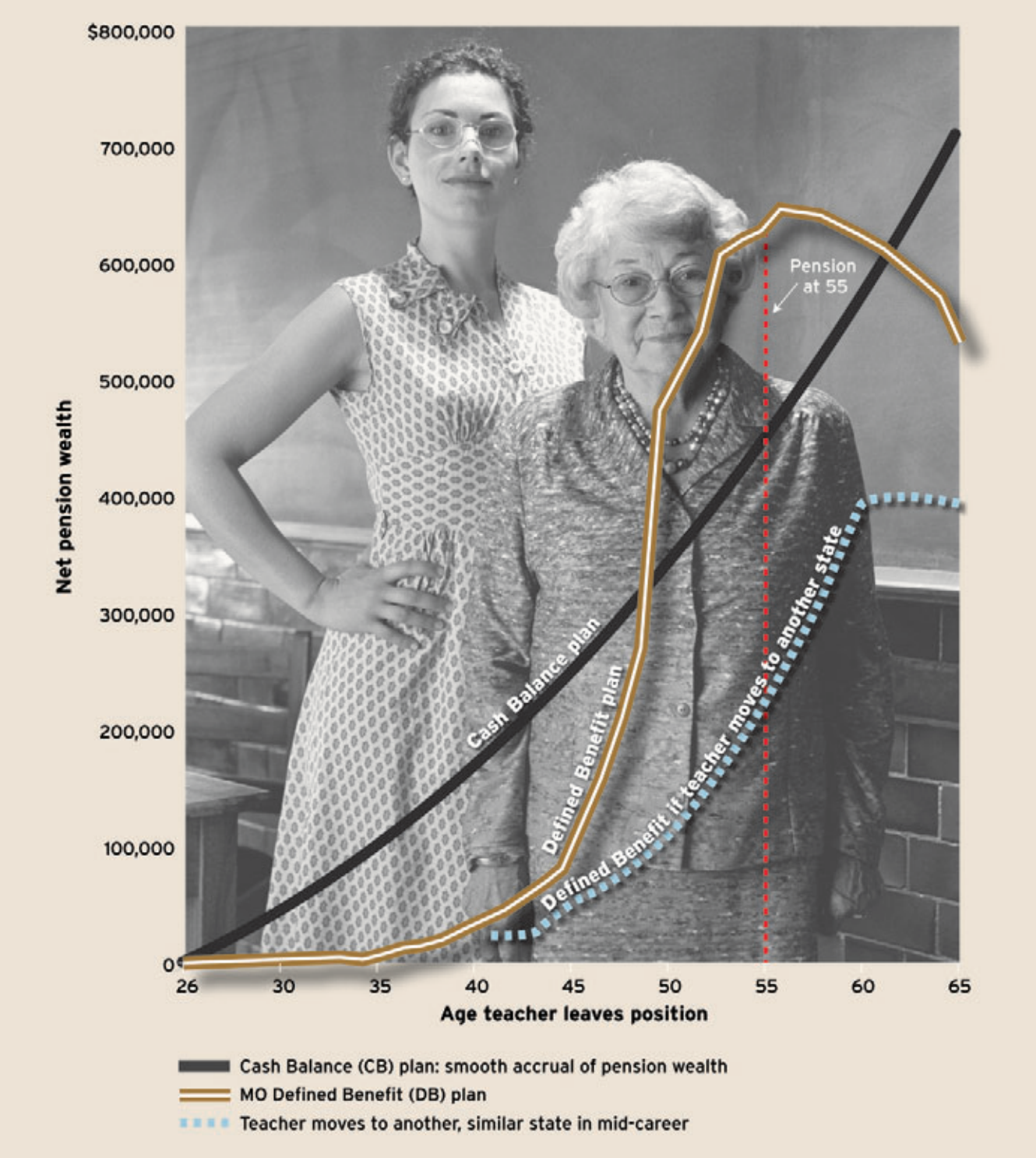
It Pays to Stay (Figure 1)

In Missouri, as in other states, teachers who leave early, or move elsewhere, fare poorly in pension benefits compared to those who stay.



Notes: Teacher enters at age 25 and works continuously. The steady increase shown in the CB curve equals the employers' contributions in each year, plus a guaranteed annual return. No year of service counts more than any other year and net pension wealth is a constant proportion of cumulative earnings. The portion of the DB line that falls below the CB line shows teachers getting less than this proportionate share. When the DB line is above, teachers get more than this share. When teachers move to another state with a similar plan, they lose a substantial amount of pension wealth. In this example, the loss is more than $400,000, primarily because the pension is deferred to age 60, instead of 55.

SOURCE: Authors' calculations. See unabridged paper.

ILLUSTRATED GRAPH / BRUCE SANDERS DESIGN / PHOTO: GETTY IMAGES

Golden Handcuffs

Teacher pensions consume a substantial portion of school budgets. If relatively generous pensions help attract effective teachers, the expense might be justified. But new evidence suggests that current pension systems, by concentrating benefits on teachers who spend their entire careers in a single state and penalizing mobile teachers, may exacerbate the challenge of attracting to teaching young workers, who change jobs and move more often than did previous generations.

The design of teacher pension plans is a timely concern: like other public pension plans, those for teachers are becoming more costly. Employer contributions to pension funds tack on a larger percentage of earnings for public school teachers than for private-sector managers and professionals, and this gap is widening (see "Teacher Retirement Benefits," *research*, Spring 2009, Figure 1). Those data do not yet reflect the impact of the stock market decline since 2007: the drop in the value of pension funds means further increases in employer contributions will be required to fund promised benefits. As fiscal concerns force states to reevaluate the costs of teacher pension plans, officials might also consider the plans' consequences for teacher quality.

Teachers who change jobs or move pay a high price

In earlier work we highlighted the peculiar incentives for retirement built into these plans (see "Peaks, Cliffs, and Valleys," *features*, Winter 2008). Most plans create large spikes in pension wealth accumulation for teachers in their 50s. These spikes act as an incentive for teachers to stay in the classroom until their pension wealth reaches its peak and then push them into retirement shortly thereafter, as pension wealth accumulation turns negative.

By ROBERT M. COSTRELL and MICHAEL PODGURSKY

We now extend this line of research by focusing on the distribution of pension benefits among teachers of varying career lengths and the penalties for those who switch systems. We examine pension formulas in six state plans and develop measures of the redistribution of pension wealth from teachers who separate early to those who separate later. We compare existing defined benefit (DB) teacher pension systems to fiscally equivalent systems that treat all teachers equally and find that the former often redistribute about half the pension wealth of an entering cohort of teachers to those who separate in their mid-50s from those who leave the system earlier. We then show that this back loading produces very large losses in pension wealth for mobile teachers. Compared to a teacher who has worked 30 years in a single state system, a teacher who has put in the same years but split them between two systems will often lose well over one-half of her pension wealth. It is difficult to justify such a system of rewards and penalties on grounds related to fairness or teacher quality.

Teacher Pensions 101

Public school teachers are almost universally covered by traditional defined benefit pension systems. In such a system, the employer has an obligation to provide a regular retirement check to employees upon their retirement. Typically, a DB teacher pension plan requires that both teachers and employers make a contribution each year to a pension trust fund. The salient characteristic of a traditional DB system is that for any individual, benefits are not tied to contributions.

More specifically, once a teacher is "vested" (usually after 5 or 10 years), she becomes eligible to receive a pension upon reaching a certain age or length of service. These eligibility rules vary across states, but they typically allow a teacher to draw a pension well before age 65, especially if she has been working since her mid-20s. Benefits at retirement are usually determined by a formula that takes into account years of service and the final average salary (FAS), which is an average of the last few years of salary (typically three). In Missouri, for example, teachers eligible for normal retirement earn 2.5 percent (the "multiplier") for each year of teaching service. Thus, a teacher with 30 years of service would earn 75 percent of the final average salary. So if the FAS were $60,000, she would receive $45,000 every year for the rest of her life. If the teacher were to separate from service prior to being eligible to receive the pension, the first payment would be deferred and the amount of the pension would be frozen until that time. Once the pension payments begin, there is typically some form of inflation adjustment, although the specifics again vary from state to state.

We examined teacher pension plans in six states. While the states were not randomly chosen (we inhabit two of them), their plans are indicative of many teacher pension plans. Because the composite effect of each system is hard to discern by simply looking at the benefit formula, we examine patterns of pension wealth accumulation by age of separation.

Calculating Pension Wealth

We use the benefit formulas of pension plans to estimate the pension wealth of individual teachers. When an individual retires under a DB plan, she is entitled to a stream of payments that has a lump-sum value that we calculate using standard actuarial methods (which take into account expected mortality patterns and adjust the sum of payments to reflect the fact that they are received over many years rather than at a single point in time).

The heavy S-shaped curve in Figure 1 depicts pension wealth (net of employee contributions) for 25-year-old entrants to the Missouri teaching force who work continuously until they leave teaching at various ages. The salary schedule assumed is that of the state capital (Jefferson City), under which teachers receive experience-based salary increases and are also paid more if they have a master's degree. The accumulation of pension wealth is not smooth and steady, but rises with fits and starts, due to rules of eligibility for early retirement and the like. In Missouri, after vesting at five years, a teacher is eligible for a pension at age 60. Her pension wealth—the current value of those deferred benefits—grows fairly steadily until age 45. The curve becomes steeper at age 46 because of a provision that allows teachers to begin collecting a pension when their age and years of service sum to 80, which brings her pension forward to age 59 and earlier. Then there is a big jump at age 50, because the 25th year of service makes a teacher eligible for an immediate pension (albeit with a reduced multiplier). Growth in pension wealth continues to be rapid in subsequent years as the multiplier is increased to its "normal" rate of 2.5 percent. Then, following a final bump in the benefit formula's generosity at 31 years of service (age 56), net pension wealth starts shrinking. As is evident, complex pension rules lead to pension wealth curves that are irregularly shaped and bear no resemblance to the smoothly growing cumulative value of contributions.

(Pension) Wealth Redistribution

The result of these complex pension rules is that teachers who leave the profession in their 50s receive more pension wealth (as a percentage of cumulative earnings) than those who separate earlier. To develop a measure of the resulting redistribution, we compare existing DB systems to a fiscally equivalent plan where pension wealth is neutrally distributed: a cash balance (CB) system. CB systems calculate employee retirement benefits based on the cumulative contributions,

with a guaranteed rate of return. Thus, pension wealth is a fixed percentage of cumulative earnings, regardless of retirement age.

In dollar terms, pension wealth grows smoothly under a CB system. Figure 1 compares the accrual of pension wealth under Missouri's DB plan (the S-shaped curve) with the smooth accrual under a hypothetical CB plan. This diagram readily illustrates the redistribution of pension wealth toward those who retire in their 50s from those who leave teaching earlier. Teachers who retire before age 49 in Missouri receive less pension wealth than they would under a CB plan, while teachers who retire later receive considerably more.

The salient characteristic of a traditional Defined Benefit system is that for any individual, benefits are not tied to contributions. Once a teacher is "vested," she becomes eligible to receive a pension at a certain age or length of service.

We have developed a numerical measurement of this redistribution. Specifically, to compare net pension wealth across different ages of separation, we measure it at a fixed point in time, and we also estimate the frequency of separations at different ages. In this fashion, we can calculate weighted averages of net pension wealth for winners, losers, and the whole cohort of 25-year-old entrants. When we compare the Missouri plan to the fiscally equivalent CB plan, we find that 46 percent of pension wealth is redistributed from those leaving teaching at an average age of 36.6 to those separating at an average age of 54.2.

We made the same calculations of the distributional impact of the DB plans in the other states. In all states, the degree of redistribution is substantial. In Massachusetts, for example, average pension wealth is low, but 61 percent of it is redistributed. The degree of redistribution is also relatively high in Ohio (49 percent) and Texas (47 percent, for new hires), while it is somewhat lower in Arkansas (39 percent) and California (36 percent). As in Missouri, the redistributive gains are concentrated among those who retire in their 50s, while the losses are dispersed among all early leavers. This pattern holds particularly true for Massachusetts, where the gains are concentrated among just one-fifth of the cohort.

To summarize, there is significant variation among states in the magnitude of the gains and losses compared to a simple CB system, but all states redistribute net pension wealth to a substantial degree to those who retire in their 50s (after about 30 years of service) from those who leave a teaching position after shorter periods. In addition to the issue of equity, this has serious implications for teacher mobility, to which we now turn.

Moving Costs

It is well understood that DB pension plans penalize mobility, yet the sources of these costs are rarely delineated or quantified in a systematic way. There are several factors that reduce pension wealth when a teacher moves. First, teachers who leave a system before they are vested have no claim on a pension. Upon termination, or shortly thereafter, any teacher contributions are returned with interest (the rate varies, and can be well below market), but the teacher does not receive employer contributions. This is a major source of loss for many young teachers, since most teacher pension systems have a vesting period of five years or longer and the vast majority of early-career teacher turnover occurs in the first five years on the job. In fact, nine states have a 10-year vesting period for teachers. With such long vesting windows, many teachers will receive no employer contributions toward retirement as a result of their work in the classroom.

Although the effects of these vesting windows are large, they are at least fairly transparent for young teachers. This information is routinely provided to those newly hired. Even for teachers who are vested, however, there remain potentially large costs from mobility, and these are less obvious. One cost comes from the fact that teacher DB pensions are all based on final average salary. When a teacher leaves the profession before normal retirement age, the value of her annuity is tied to her salary at the time of her separation. No adjustment is made for ensuing salary growth or inflation.

Other costs to mobility arise from the service eligibility rules for normal and early retirement. Teachers who separate from a plan with, say, fewer than 20 years of service will often not be able to begin collecting their pensions until much later than teachers who remain in the plan until they meet eligibility requirements. At any given age, pension wealth is therefore lower for the mobile teacher—who has left one system early and entered another system late—simply because she can

expect to collect fewer pension checks. Alternatively, she may be able to draw her pension at the same time as the teacher who stays in one system, but with a penalty. Either way, the costs are substantial.

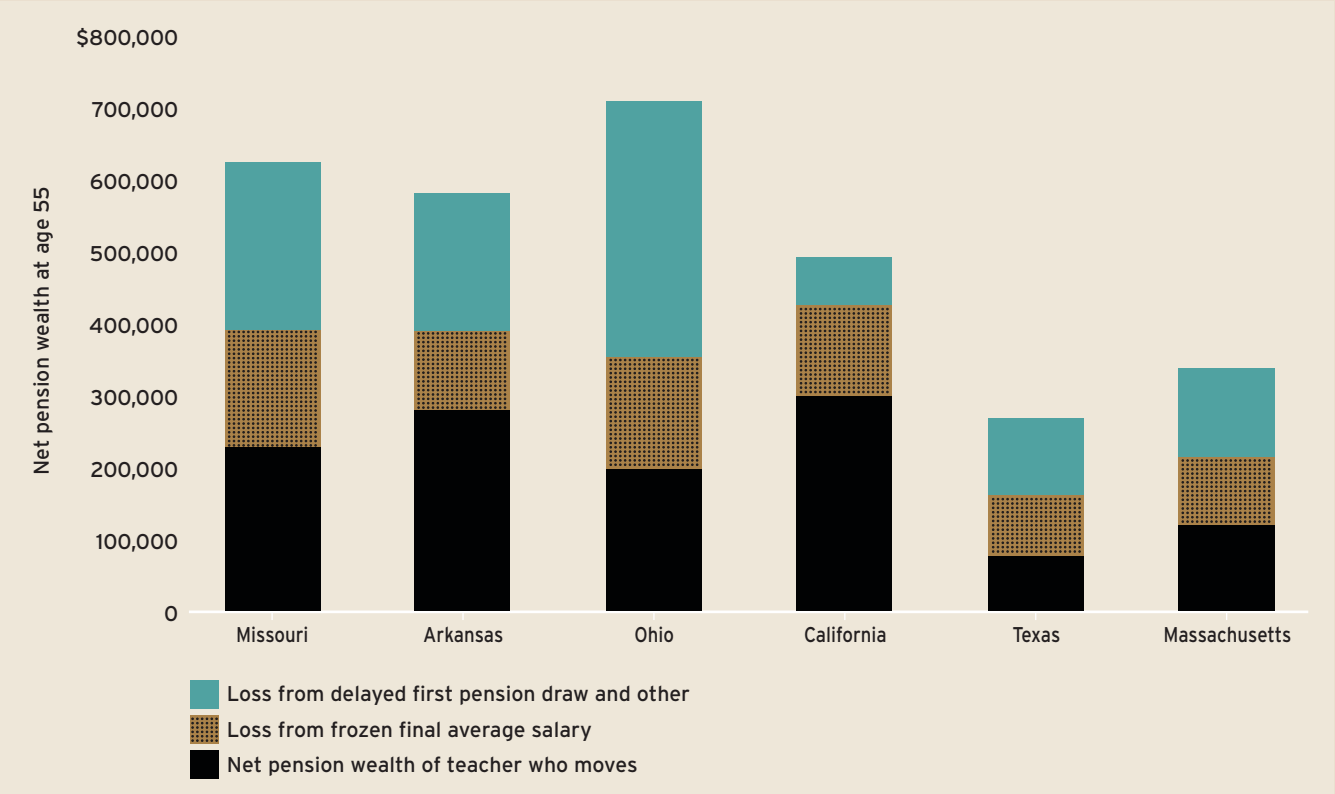
Switching Systems

Pension wealth calculations similar to those above provide a comprehensive method for evaluating the costs of mobility. Specifically, let us continue to examine the pension wealth of a hypothetical teacher who enters at age 25 and works continuously. However, now, rather than working continuously in the same system, at age 40, after 15 years in state A, she moves to state B, which has the same pension formula and same pay grid, and ultimately retires. We assume that she collects two pensions, one in each of the states in which she worked. The pure mobility cost can be thought of as the loss from moving at age 40 to an identical state, but with zero creditable service.

The hypothetical wealth trajectory described above is depicted as the dotted curve in Figure 1 for Missouri. As discussed above, the heavy solid curve illustrates net pension wealth for continuous service under the DB plan, evaluated at date of separation. The dotted segment represents the wealth trajectory for a teacher who moves after 15 years, at age 40, diverging at that point from the solid curve for the teacher who stays. For the first five years, the dotted curve is flat since the teacher must get vested in the new system. After vesting, the teacher is entitled to two pensions, one from the old job and one from the new one. However, the loss from mobility continues to widen in the following years, as the teacher who stays becomes eligible for earlier and earlier retirement, while

Explaining Losses from Mobility (Figure 2)

Service-based eligibility rules and the use of final average salary to calculate benefits contribute to pension losses for teachers who move to other states.



Notes: Splitting service credit between two jobs can delay eligibility for first pension draw or reduce the replacement rate. Losses also result from freezing final average salary on the first job. The total bar height gives the net pension wealth of a teacher spending her entire career in the state, while the bottom portion, in black, gives the net pension wealth of the teacher who moves to another state. Calculations assume teachers enter the profession at age 25, spend 15 years in their first job before taking a teaching job in another state with identical pension rules, and retire at age 55.

SOURCE: Authors' calculations. See unabridged paper.

the teacher who moves does not earn enough service credit to advance the pension from age 60.

Under a continuous career, our hypothetical teacher would obtain 30 years of service by age 55, qualifying her for "normal" retirement benefits immediately at 75 percent of final average salary. This is worth $626,088 at age 55. The split career of the mobile teacher means that she receives two annuities, each of which is for 37.5 percent of final average salary, but the FAS for the first pension is of course much lower. In addition, neither the first nor the second pension would be drawn until "normal" retirement at age 60. This means that five years of pension payments are lost. These two factors together reduce the net pension wealth to $219,163, a loss from mobility of $406,925. This is the gap between the dotted and solid curves in Figure 1 at age 55. The cost of mobility is 65 percent of pension wealth.

By contrast, under the hypothetical cash balance system, also depicted in Figure 1, there is no loss from mobility. Net pension wealth, the cumulative value of employer contributions, is a constant percentage of cumulative earnings, regardless of whether they accrue in one job or two.

Table 1 provides summary calculations of these mobility losses for all six states. A glance down the first column shows substantial mobility costs in all six states, ranging from approximately $200,000 to more than $500,000. As the table also shows, these losses are large in relative terms as well, ranging from 41 percent to 74 percent of net pension wealth for teachers who stay.

Figure 2 depicts the sources of these losses, as well as the variation across states. For each state, the full bar gives the net pension wealth of a teacher who stays in the system to age 55, and the bottom portion, in black, is that of the mobile teacher. The middle portion gives the loss from mobility due to freezing FAS on her first job. The top portion gives the mobility cost imposed by service eligibility rules. Specifically, splitting 30 years of service credit between two jobs delays the first pension draw and can also affect the replacement rate (the annual pension as a percentage of FAS).

Moving and Losing (Table 1)

Teachers who enter the profession at age 25 and spend 15 years in their first job before taking a job in another state and teaching for 15 more years lose substantial amounts of net pension wealth.

	Loss of net pension wealth by age 55 of teacher who moves at age 40	Loss by age 55 as a percentage of net pension wealth
Ohio	$522,865	74%
Missouri	$406,925	65%
Arkansas	$312,335	54%
California	$201,409	41%
Texas (new hires)	$197,220	73%
Massachusetts	$194,627	58%

SOURCE: Authors' calculations. See unabridged paper.

The costs from the split in service credit are generally large and vary across states. In Missouri, Arkansas, and Ohio, these rules lead to a delay of first pension draw from age 55 to 60, while in California, the first draw is delayed to age 57. In Texas, the mobile teacher delays first draw to 63, but she gains a higher replacement rate as a result. In Massachusetts, there is no delay for first draw, but the mobile teacher sacrifices a large increase in the replacement rate that is awarded to 30-year veterans. All in all, the service eligibility rules for early retirement, pension bumps, and the like—little known to the general public (and, we suspect, to many young teachers)—can impose large costs on teachers who move.

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Final Considerations

Our work offers the first detailed analysis of the distribution of net pension benefits among teachers of varying ages of separation and the corresponding costs that teacher pension systems impose on mobile teachers. We find that in a typical DB

system, compared to a neutral system, half an entering cohort's pension wealth is redistributed to teachers who separate in their 50s, from those who separate earlier. One of the main reasons is that teachers who teach into their 50s can start collecting a pension immediately, while teachers who leave earlier often must defer their pension until age 60 or later, so they collect fewer payments over their retirement.

This inequality in benefits produces very large losses in pension wealth for mobile teachers. We estimate that teachers who split a 30-year career between two pension plans often retire with less than half the pension wealth accrued by teachers who complete a similar career in a single system. Again, one of the main reasons is that teachers who split their career often cannot begin collecting pension payments as early as those who stay in one system.

Our discussion has focused on teachers. However, the problems we have identified extend to other professional staff in public schools. School administrators are always included in teacher retirement systems. The market for administrators in urban school districts is increasingly becoming national in scope, yet for mobile administrators retirement benefit systems with 5- to 10-year vesting systems can have a devastating effect on retirement savings.

The impediments to mobility—for both teachers and administrators—may be particularly problematic for charter schools. Many charter schools are part of organizations (e.g., Knowledge Is Power Program [KIPP], Edison Learning, Imagine Schools) that operate in more than one state. Edison Learning, for example, operates schools in 16 states. As these schools attempt to replicate their school models, it is valuable to them to move staff from one location to another, particularly when they start new schools, in much the same way business firms relocate managers. As we have shown, current educator retirement benefit systems make such mobility very costly in those states where charter school employees are required to participate in the state's teacher pension plan.

Such a system of rewards and penalties is hard to justify. To appreciate the importance of mobility, consider the large differences in the growth of public school enrollment between states. The National Center for Education Statistics projects that states such as Nevada and Arizona will see enrollment growth in excess of 40 percent between 2005 and 2017. Louisiana, Vermont, and Rhode Island can expect enrollment declines of 10 percent or more over this same period. Heavily populated states such as Michigan and New York can anticipate declines of between 5 and 6 percent. In a well-functioning labor market, one would see considerable movement of workers from areas of contracting demand to areas in which demand is increasing. In the case of teaching, however, the pension systems impose large costs on those who move.

The barriers to reform are primarily political. First, states have a coordination problem. It is in no state's individual interest to facilitate mobility out of the state; to the contrary, states are inclined to keep average pension costs down by skimping on benefits for those who depart. In addition, the distribution of benefits within states between short-term and career teachers will be governed by the relative influence of junior versus senior educators in educator groups and state politics. Influence generally increases with seniority for a variety of reasons, and these are enhanced in the case of pension politics, because the benefits of pensions are far more immediate and tangible for senior educators than for junior ones. The opaque nature of final-average-salary DB systems, with their complicated eligibility rules, only reinforces this imbalance.

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All that said, these barriers are not insurmountable. Similar issues arise in higher education, and yet the benefits of academic mobility have led many state and private universities to offer more portable retirement plans. As states grapple with the pension difficulties they now face, they should consider systems with smooth wealth accrual, such as the CB plan described in this article. Another alternative to consider might be a hybrid such as TIAA-CREF, which has features of both CB and defined-contribution plans and has proven popular in higher education. Such systems are more transparent, tie benefits more closely to contributions, and do not penalize mobility or job shopping among young teachers. At a minimum, education policymakers should consider experiments that provide actuarially fair alternatives to traditional DB plans for new teaching recruits, and evaluate their utility for recruiting and retaining high-quality teachers.

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