

# REFORMING K-12 EDUCATOR PENSIONS: A LABOR MARKET PERSPECTIVE

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## EXECUTIVE SUMMARY

Retirement benefits represent a large and growing share of educator compensation. An important question is whether the current retirement benefit systems are an efficient or equitable way to structure educator compensation. An examination of the incentives built into typical state defined benefit plans suggests otherwise. Benefits are highly back-loaded, producing large peaks in pension wealth accrual followed by valleys of negative accrual. These have the effect of retaining teachers to a certain point (“pull”) and then pushing them into retirement beyond that point, a set of incentives that may be perverse, if teachers would otherwise optimally sort themselves into shorter or longer careers. The current systems offer little or nothing to those young teachers with a short tenure horizon, and also impose very large penalties for mobile educators, with no obvious efficiency rationale. The mobility penalties are likely to particularly distort the applicant pool for school administrators. This array of issues for current educator DB plans suggests that plans with more uniform life-cycle accrual and mobile benefits would likely provide a better fit for educator labor markets. The current crisis that many states face with public education pension funding provides an opportunity to reform retirement benefits along these lines. Unfortunately, thus far states are modifying existing systems (e.g. raising the retirement age for new hires), rather than reforming their basic structure. These reforms may improve actuarial balance but do little to improve incentives or equity and can, in some respects, make matters worse. It is theoretically possible to structure pension reforms in a way that manipulates conventional formulas to yield smooth accrual of benefits over an educator’s working career. However, it is much simpler and more transparent to do so directly, by tying benefits more closely to contributions, as in a cash balance plan or hybrid retirement plan. Equally important, codifying the principle of tying benefits to contributions would do much to prevent future funding crises arising from arbitrary enhancements of idiosyncratic pension rules.



## INTRODUCTION

Retirement benefits represent a large and growing share of educator compensation (Costrell and Podgursky, 2009a). An important policy question is whether the dollars spent on the current teacher retirement benefit systems are efficiently structured to recruit and retain a high quality educator workforce.<sup>1</sup> This question takes on special urgency as the serious funding shortfalls for educator retirement benefit systems continue to place stress on state and local budgets. The restructuring of these plans that seems to be inevitable creates an opportunity to consider basic reforms. In this brief we argue that the current defined benefit plans have very powerful, but highly peculiar, incentive effects that have no efficiency rationale given school staffing needs. We do this by analyzing the way teacher pension wealth accrues over the life cycle. We conclude that pension policy reforms that create a smoother accrual pattern, tying benefits more closely to contributions, as in cash balance type defined benefit plans, would likely do a better job of recruiting and retaining qualified educators.

## PENSION WEALTH ACCRUAL

Public school teachers are almost universally covered by traditional defined benefit (DB) pension systems (Hansen, 2010; Costrell and Podgursky, 2010a). In such a system, the employer has an obligation to provide a regular retirement check to employees upon their retirement, based on years of service, possibly age, and final average salary. Typically, teacher pension plans require that both teachers and employers make a contribution each year to a pension trust fund. On average, these contributions are smaller for the majority of teachers who are part of the Social Security system and larger for the roughly thirty percent who are not (Costrell and Podgursky 2009a). Contributions must not only cover the currently accruing liabilities (known as “normal costs”) but also amortization of previously accrued unfunded liabilities (the so-called “legacy costs”). The salient characteristic of these educator systems is that for any individual, benefits are not tied to contributions, a point we will take up further below.

Once a teacher is vested (usually five years, but in some states up to ten), she becomes eligible to receive a pension upon reaching a certain age and/or length of service. Different variants of these eligibility rules are discussed below 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 of the following sort:

$$\text{Annual Benefit} = m(\text{YOS}, \text{Age}) \times \text{YOS} \times \text{FAS}. \quad (1)$$

In this expression, *YOS* denotes years of service, the final average salary (FAS) is an average of the highest few years of salary (typically three) and *m* is a percentage commonly referred to as the “multiplier,” which may be constant, but can be a function of service and age.<sup>2</sup> In Missouri, for example, teachers at normal retirement earn 2.5 percent for each year of teaching service. Thus, a teacher with 30 years of service would earn 75% of the final average salary. So if the FAS were \$60,000 she would receive:

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

payable for life.<sup>3</sup> If the teacher were to separate from service prior to being eligible to receive the pension, the first draw would be deferred and the amount of the pension would be frozen until that time. Once the pension draw begins, there is typically some form of Cost of Living Adjustment (COLA). In some states this is *ad hoc* while in others it follows a specified formula.

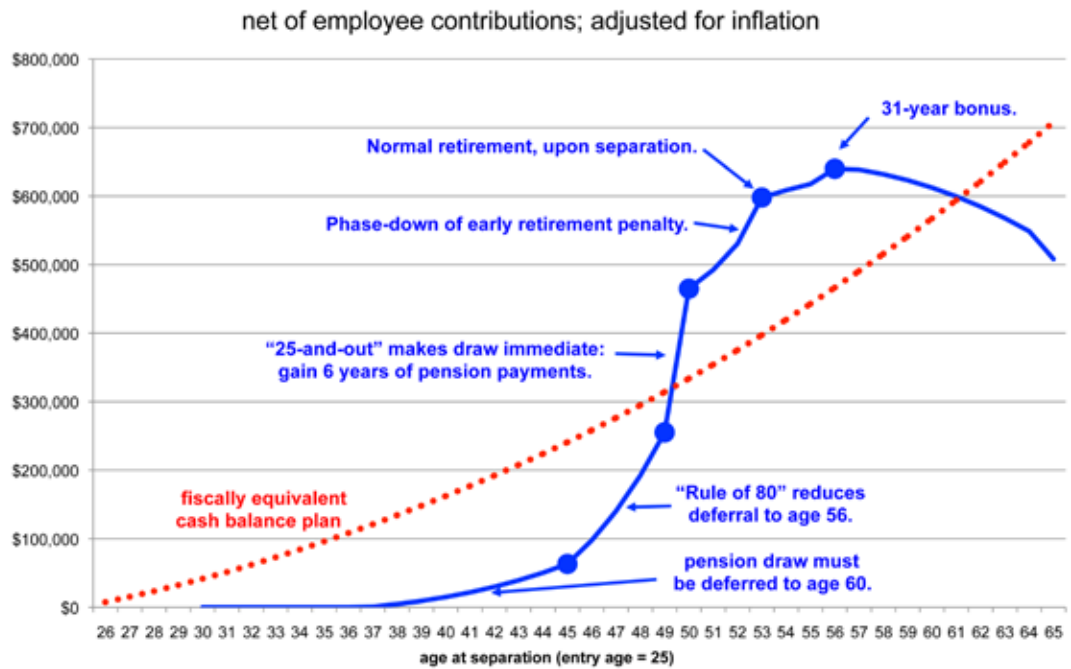
- 1 An additional question is whether the current mix of salary and retirement benefits optimizes educator quality. For the purposes of this paper, we will take that mix as given. It is our assumption that the fiscal crisis will force reductions in the pension component of compensation, so we focus on how that component should be structured.
- 2 States will often specify a multiplier for “normal” retirement but also have various “early” retirement provisions that can be expressed as age-or-service-based reductions in the “normal” multiplier.
- 3 For simplicity we are describing a single life annuity. Other options are available with reduced benefits for the retiree, to provide benefits for a surviving spouse. However, our analysis of pension wealth accrual is unaffected by payment options chosen by the retiree, since they are generally calibrated to be actuarially equivalent in cost.

The eligibility conditions for full benefits, the adjustments for early retirement, the specifics of the COLA (simple/compound, caps/floors), and so on, vary from state to state and can be very complicated. The composite effect of these rules, whether they are simple or complex, is hard to discern from the system’s parameters. For this reason, we focus on the calculation of pension wealth. When an individual retires under a DB plan he or she is entitled to a stream of payments that has a lump sum value—the present discounted value—that can be readily determined using standard actuarial methods.

In principle, pension wealth represents the market value of an annuity. If, instead of providing a promise to pay annual benefits, the employer were to provide a lump sum of this magnitude upon separation, the employee could buy the same annuity on the market. The teacher’s pension wealth is the size of the 401(k) that would be required to generate the same stream of payments she would be owed upon separation at any given age. (For calculation details, see Costrell and Podgursky, 2009b.) In this brief we will consider net pension wealth, the present value of benefits net of the cumulative value of employee contributions.<sup>4</sup> Thus, this is the present value of the benefits provided by the employer.

The solid curve in Figure 1 depicts net pension wealth, in inflation-adjusted dollars, for a 25-year-old entrant to the Missouri teaching force who works continuously until leaving service at various ages of separation. The salary schedule assumed is that of the state capital (Jefferson City), under which teachers receive annual step increases and also lane increases as they move from a B.A. to a master’s degree.<sup>5</sup>

**FIGURE 1**  
**NET PENSION WEALTH, 25-YEAR-OLD MO ENTRANT**



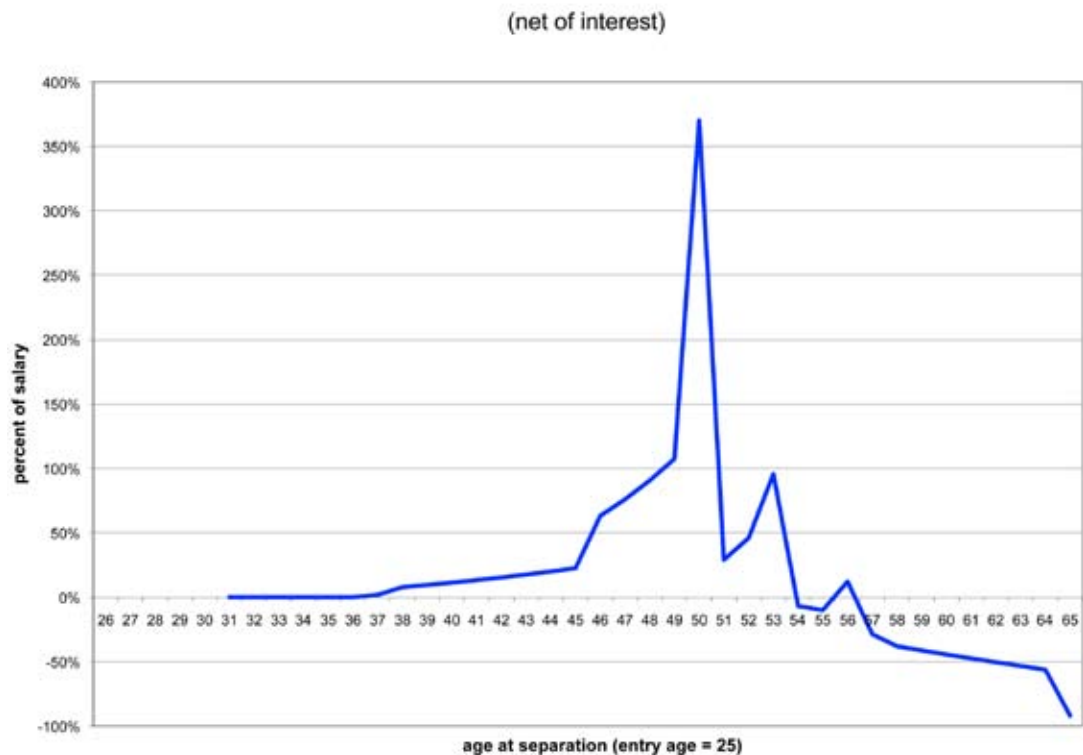
4 Since employees have the option of withdrawing their own contributions upon early separation, net pension wealth is generally non-negative (see note 17 below, for an exception).

5 The whole salary grid is assumed to grow at the rate of inflation, set here at 2.5 percent. Missouri’s COLA equals the inflation rate, but with benefits capped at 1.80 times the initial annuity payment. Expected benefits are calculated using the 2004 CDC mortality table for females. Benefits are discounted at 5 percent, a rate that is lower than assumed by public actuarial reports, and corresponding more closely to the standard set by finance economics. However, this does not affect the general shape of the curves, which is what drives our policy analysis.

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. After vesting at 5 years this teacher is eligible for a pension, but it must be deferred until age 60. The present value of this pension is less than the cumulative value (with interest) of the employee's contributions, so a teacher separating in her early 30s is better off withdrawing her contributions. Thus, net pension wealth is zero until age 37. It then grows slowly to age 45, reaching about \$63,000, the net present value of an annuity collectible at age 60. The accrual of net pension wealth begins accelerating (so the curve in Figure 1 gets steeper) at age 46 because of Missouri's "rule of 80." This rule makes a teacher eligible for retirement when the sum of age and YOS equals 80. Thus, at age 46, such a teacher, leaving with 21 years of service, will be eligible to collect her pension for an extra year, starting at age 59 instead of 60. The rule of 80 continues to add an extra year of pension benefits for each additional year of service up to age 49, at which point she need only defer her pension to age 56. Then, there is a big jump at age 50, because her 25th year of service makes her eligible for an immediate pension (albeit with a reduced multiplier) under Missouri's "25-and-out" rule. This adds 6 years worth of pension payments to what she had been eligible for at age 49, and net pension wealth jumps by over \$200,000 in that year. Growth continues to be rapid in subsequent years as the multiplier is increased to its "normal" rate of 2.5 percent. Following a final bump to the multiplier at 31 years of service (age 56), net pension wealth declines, because the increase in the starting pension due to another year of service is outweighed by the loss of that year's pension payment. We have gone through this detail to illustrate how complex pension rules, replete with discontinuities, not only lead to pension wealth curves that are irregularly shaped but, more specifically, bear no resemblance to the smoothly growing cumulative value of contributions. The dotted curve in Figure 1, discussed in more detail below, illustrates the smooth growth of such contributions, and how they contrast with the actual accrual of DB pension wealth.

The evolution of a teacher's net pension wealth over her career captures the incentives for work versus retirement embedded in the pension system. Properly calculated, the change in pension wealth (net of interest on prior pension wealth) is a measure of deferred compensation, which can be compared with current compensation. For any year of work, an educator's total compensation will be current salary and benefits plus the change in net pension wealth as a result of working that year. Figure 2 shows the annual accrual of net pension wealth, as a percentage of salary. As discussed above, net pension wealth jumps in certain years, especially as one becomes eligible for more years of benefits. In the case of Missouri, the "25-and-out" rule results in net pension wealth accrual in that year (age 50 for a 25-year-old entrant) that is worth almost four times her salary. Finally, by her 32nd year of teaching, pension wealth accrual turns negative. Even though her annual annuity is still rising (by 2.55 percent of salary per year) her overall net pension wealth is falling due to the fact that she collects the pension for fewer years. These patterns of "peaks" and "valleys" are not unique to Missouri, but are typical of many teacher pension plans (Costrell and Podgursky, 2007a, 2007b, 2009b).

**FIGURE 2**  
**ANNUAL CHANGE IN NET PENSION WEALTH, MO**



Finally, we consider an alternative type of plan which does not involve these types of peaks and valleys. A “cash balance” (CB) plan is a DB plan in which pension wealth accrues smoothly. In such a plan, educators have a notional account that earns a guaranteed rate of interest. These accounts are not individually invested, as, for example, in a 403(b) type plan. Rather, they are pooled and invested by pension fund managers as in any DB plan. Each year the value of an individual’s account grows by the guaranteed interest rate plus new contributions. At retirement, the educators can annuitize the balances in these accounts. The important point for this discussion is that pension wealth accrues smoothly and uniformly. No year of work is more remunerative for pension wealth than any other. Importantly, pension wealth accrual never turns negative. Figure 1 depicts pension wealth accrual for a CB plan, along the dotted curve. This curve is simply the cumulative value of employer contributions (with the guaranteed return), where the contribution rate is chosen to make the plan fiscally equivalent to the current DB plan depicted. (For details and calculations for other states, see Costrell and Podgursky, 2010b). In Figure 2, the annual change in net pension wealth would simply be a flat line (not shown), representing the employer’s contribution rate to the CB plan. We will return to a discussion of CB plans below.

**CONSEQUENCES OF THESE INCENTIVES**

The patterns of pension wealth accrual have important incentive effects on teachers’ labor supply decisions. We consider each of these in turn.

***Ineffective teachers are encouraged to stay too long and effective teachers to leave too soon.***

Once a teacher is vested and has accumulated 10-15 service years in the pension system, there are strong incentives to remain employed until the first pension wealth accrual peak – typically at 25 or 30 years of service, upon meeting the eligibility condition for early or normal retirement. This is the “pull” of traditional teacher pension plans. A growing body of research provides empirical evidence that teachers, like other workers, respond to such “pull” incentives.<sup>6</sup>

<sup>6</sup> For evidence on teachers, see Furgeson, Strauss, and Vogt (2006), Brown (2009), Ni, Podgursky, and Ehlert (2009), and Costrell and McGee (2010). For workers more generally, see Friedberg and Turner’s (2010) review of prior literature.

A concern here is that many of those who would respond to this incentive – those who would otherwise leave, but “hang on” for their pension – are teachers who probably *should* leave. That is, theory suggests that absent such incentives, teachers might be expected to sort themselves into short or long careers depending on whether and when they find themselves ill-suited to continue. If so, the introduction of a large reward for staying on until, say, one’s 25th year of service undermines such optimal self-selection. Instead, the prospect of such an enhanced reward induces some of the ineffective teachers to stay on instead of seeking other employment, but has no effect on those good teachers who would stay on anyway.<sup>7</sup> In other words, to use terms familiar to students of insurance markets, such a reward system introduces an element of adverse selection.

While to date, there are no systematic data to measure the extent of this effect, one frequently encounters anecdotes about “burnt out” teachers who behave in exactly this way.<sup>8</sup> The impact can be magnified, since ineffective teachers not only do a poor job in their own classrooms, they can also damage morale in the larger team in a school. The incentive for some teachers to hang on for the pension can be a particularly serious barrier to school “turnaround” plans, when a school’s new leaders try to form a cohesive teaching unit.

The “pull” incentive has a “push” counterpart. That is, beyond a certain point, traditional DB pension systems push teachers into retirement. This is because pension wealth accrual under conventional DB plans eventually turns negative. The same theoretical argument on teacher quality described above applies here: the disincentive of negative accrual has no effect on those who are ready to leave anyway, but likely alters the behavior of some of those who still have more good years to offer. That is, the artificial imposition of negative accrual (absent from defined contribution or cash balance plans) can replace optimal self-selection with adverse selection in the retirement decisions of late-career teachers.

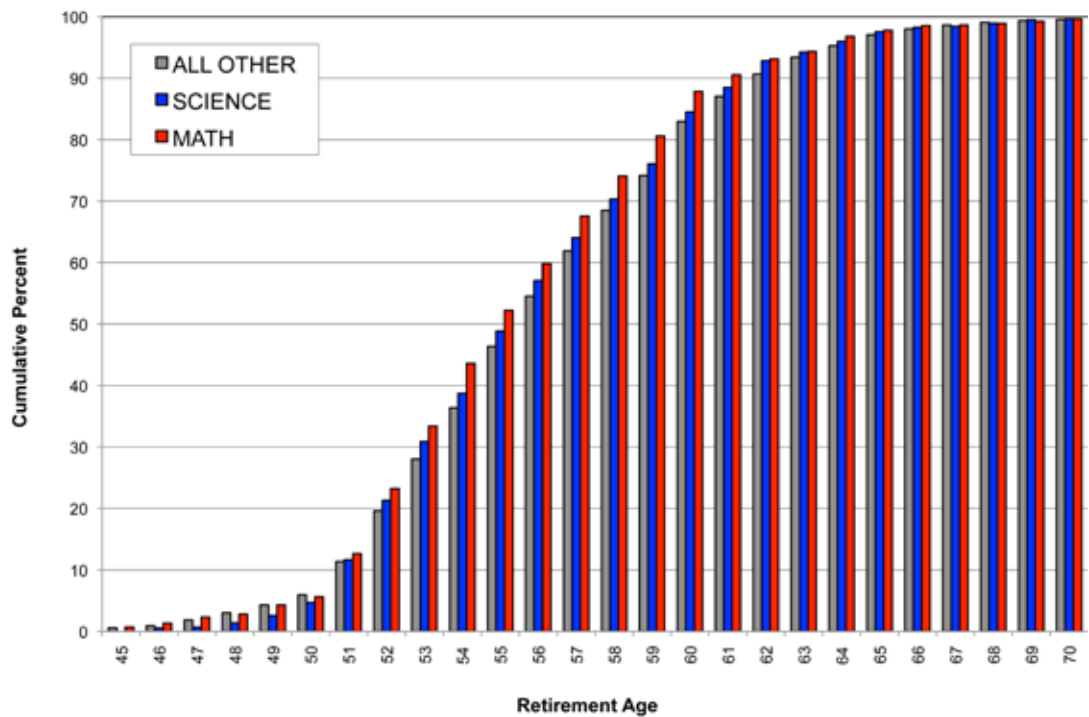
Although we have no direct evidence on teacher effectiveness and retirement behavior, we can examine some evidence on science and math teachers. Recruitment and retention of qualified STEM teachers (Science, Technology, Engineering, Math) is a high priority for state policy-makers. Figure 3 depicts the distribution of retirement ages for Missouri teachers. Here we report three groups: secondary math, secondary science, and all other teachers. In general, math and science teachers retire earlier than others. For example, over half of math teachers retire by age 55 and just under half of science teachers, both of which exceed the corresponding proportion of other teachers. The “push” of negative accrual in teacher pension systems, which leads to early retirement in general, seems to be particularly acute for these difficult-to-replace teachers.

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<sup>7</sup> Indeed, from an efficiency viewpoint, this is an unnecessary expenditure. For further discussion see Ballou (2009).

<sup>8</sup> Research is underway to examine how the response to these incentives varies by teacher effectiveness, as measured by student achievement gains.

**FIGURE 3**  
**RETIREMENT AGE, MO TEACHERS, BY FIELD, 2002-2008**



***Mobile Teachers Pay Heavy Penalties***

We have seen that the accrual of pension wealth over a teacher’s career is highly back-loaded, with the largest marginal accruals occurring at certain key ages. This means that teachers do not accrue much, if any, net pension wealth in the first decade or two of their teaching careers. Thus, if they separate from a pension system – either taking a new teaching job in another state or leaving the profession altogether – these young teachers suffer huge losses in pension wealth relative to teachers who remain in the same pension system.<sup>9</sup>

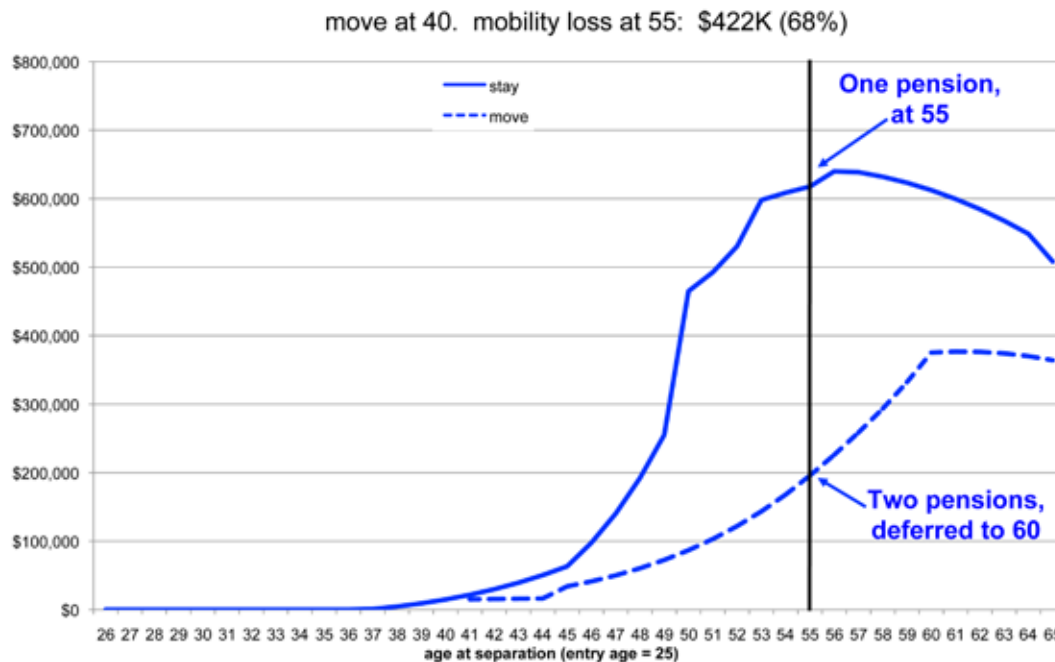
Figure 4 provides an illustration of the point (for more details see Costrell and Podgursky, 2010). Here we compare net pension wealth for teachers who work 30 years in Missouri with a teacher who works in the system for fifteen years and then migrates to another pension system identical to the one she left (this isolates the pure effect of the pension system in question). In the latter case, she draws two pensions, one from each state, but in neither state does she log enough YOS to draw a pension before age 60.<sup>10</sup> For this and other reasons, her move costs her \$422,000 in forgone pension wealth, over two-thirds of what she would have accrued had she stayed. These figures are not unusual; in the states we have examined, the losses from mobility are typically in excess of fifty percent.

9 One consequence of these highly distortionary incentives is that the typical teacher may attach a smaller value to the present value of a dollar of pension benefits than a dollar of current salary. That is exactly what Fitzpatrick (2010) finds. In a study of the willingness to pay among Illinois teachers for a pension upgrade in 1998, she finds that the implicit value of an additional dollar of DB benefits in the current system was just 17 cents for the typical teacher. Of course, there are other reasons as well that teachers may heavily discount future DB benefits.

10 Drawing two pensions is her best option. The alternative of withdrawing her contributions (but not the employer’s) from the first state would not suffice to purchase comparable service credit in her new state.



**FIGURE 4**  
**NET PENSION WEALTH, MO: MOVERS VS. STAYERS**



Research does not yet exist to tell us what the net effect of these mobility penalties are on workforce quality. Harsh penalties for mobility will obviously tend to dissuade mobile individuals from entering or reentering teacher labor markets. Whether these are more or less effective teachers remains to be determined. However, to the extent that mobility costs impede the reallocation of teachers to markets where they are in most demand (as student populations shift), this penalty does seem likely to impose some efficiency cost on teacher markets.

***Administrator labor markets are likely distorted***

As noted above, DB plans can impose very harsh costs on movers. These costs likely have a substantial distortionary effect on administrator applicant pools. Administrators who accept jobs in another state with 10-20 years of service in their prior state plan face very large losses in pension wealth. This makes them less likely to apply for jobs covered by another pension plan (at least at younger ages). Thus, the applicant pool for administrator positions is largely restricted to members of the existing pension plan, unless additional retirement sweeteners are added to the offer.

This is also a problem for high quality and popular charter school firms such as KIPP Academies<sup>11</sup> that might like to move administrators and other professional staff from one state to another to start up new schools. Not surprisingly, in states that permit charter schools to opt out of the teacher pension plans, many have chosen to do so.

While DB plans discourage mid-career professionals from crossing state lines, they also provide strong incentives for older teachers to take administrator jobs simply to boost final average salary immediately prior to retirement. This is because pension annuities are based on final average salaries (typically an average of the highest 3-4 years of salary). Thus, a teacher on a nine-month salary has a strong incentive to take a 12-month administrator job at the end of a teaching career.

11. KIPP stands for Knowledge is Power Program. See <http://www.kipp.org/>.



### *Incentives for gaming*

We have argued that a basic problem with DB systems is that the annuity payment for any worker is not tied to contributions over one's working career, but rather to salary in the final years of work and total service years. This creates incentives for participants to manipulate either of these variables. Consider sick leave. A number of states allow educators to roll unused sick days into service years. Since a teacher's annual allotment of sick days is typically high relative to the number of workdays, this allows educators in some states to purchase multiple years of service. In Illinois, for example, retiring educators can "buy" up to two years of service by cashing in unused sick days (at a low price, 1 year = 170 days). We know of one school district that "sells" sick days back to teachers at a bargain price of \$20 per day.<sup>12</sup>

A more common behavior is to "spike" final average salary. If an educator can boost her salary for several years prior to retirement, she can receive a very substantial boost in pension wealth. For our Missouri teacher with thirty years experience, a one dollar increase in final average salary boosts pension wealth by 15 dollars. Many pension systems place caps on end-of-career pay boosts to limit such opportunistic behavior.

Unfortunately, school districts have little incentive to discourage such activities. In fact, they are frequent collaborators.<sup>13</sup> Thus, from the viewpoint of the state, the system creates problems of moral hazard on the part of both the participants and the districts. First, the administrators of the schools are in the same system and can avail themselves of the same opportunities for gaming. Second, there is the 'free rider' problem. Even if a district decides to resist such activities, it will receive little or no budget savings. This is because the state pension system covers all other school districts and, in some states, the same system covers state employees as well. If a single school district saves the pension system one dollar, it will realize little or none of these savings in its own costs. Thus school districts routinely view shifting employees on to the pension system as a way to 'save' money. For example, suppose a teacher with 25 years of experience earns \$80,000 and a new teacher earns \$40,000. If the senior teacher is induced to retire early (for example with boosts to annual pay in her final years) and is replaced by a new teacher, the district 'saves' \$40,000 per year in salary. The problem is that the district is not paying the full costs of its human resources policy; it is shifting a significant part of the cost to the pension system.

In addition, state legislatures have themselves enacted such enhancements within the FAS pension formula. In 1996, for example, Missouri expanded the definition of FAS for the pension calculation by adding in the cost of health insurance (without a commensurate increase in the contribution rates). Here, too, cost-shifting can play a role in enabling such enhancements, as current legislators push costs on to the future by various government accounting practices. The structure of FAS systems provides ample scope for ingenious "tweaks" to enhance benefits.

### **OPTIONS FOR REFORM**

The current crisis in pension funding has led a number of states to consider and, in some cases, enact reforms to their teacher pension systems. These reforms, ranging from superficial to dramatic, have been motivated by fiscal considerations, but the opportunity does exist to also address the labor market issues discussed in this brief. Specifically, we consider the patterns of pension wealth accrual under enacted and potential reforms.<sup>14</sup>

#### *Raising Retirement Eligibility Conditions*

States have enacted a variety of benefit reductions for new teacher hires. A particularly dramatic example is the state of Illinois. Illinois raised its vesting requirement from 5 years to 10, changed the final salary calculation from a 4-year average to 8 years, reduced the COLA for retirement benefits, and, most notably, raised the retirement eligibility conditions. For current employees (those hired prior to January 1, 2011), normal retirement is available at age 62 with 5 years of service,

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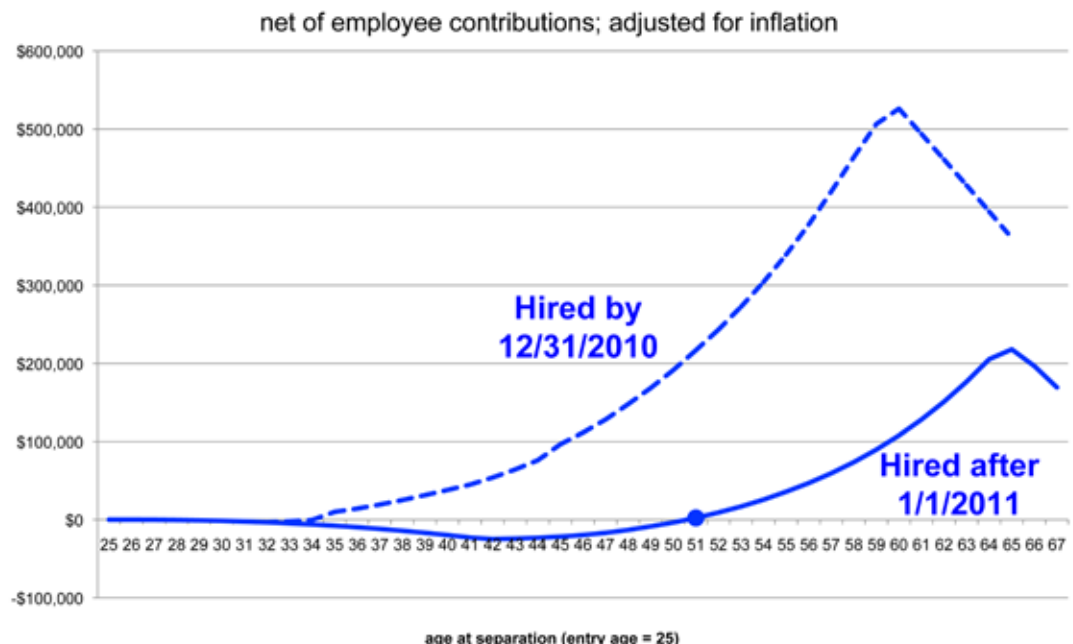
12 Township High School District 214. (2009, pp. 55-56).

13 For example, in Illinois, it is often written into a district's collective bargaining agreement that salaries will go off the usual grid, and rise, instead, 6 percent annually in the four years preceding retirement, the maximum amount of "spiking" allowed by the pension system. Thus, the cap becomes, in effect, a floor as well.

14 We do not consider the fiscal impact here, even though that is the main motive for these reforms.

or age 60 with 10 years. For those hired after January 1, 2011, the new law raises the normal retirement age to 67 with 10 years. The conditions for early retirement (i.e. retirement with a reduction from the normal benefit formula) were also raised, from age 55 (with 20 years) to age 62 (with 10 years).<sup>15</sup> These changes dramatically reduce the pension wealth accrual, as shown in Figure 5.<sup>16</sup> According to our calculations, a 25-year-old entrant would not accrue positive net pension wealth until age 51;<sup>17</sup> if she left teaching before then, she would be better off cashing out her contributions than leaving her money in for her pension.

**FIGURE 5**  
**NET PENSION WEALTH, IL: NEW VS. OLD LAW**



This example is rather dramatic, but it does illustrate the general point that cutting benefits by raising the retirement eligibility conditions, without changing the fundamental structure of the formula, will increase the back-loading of benefits. It can eliminate the sharp spikes in pension wealth accrual that currently arise in one’s 50s, but it exacerbates the redistribution of benefits from early separators to career teachers, and increases the penalty on mobility.

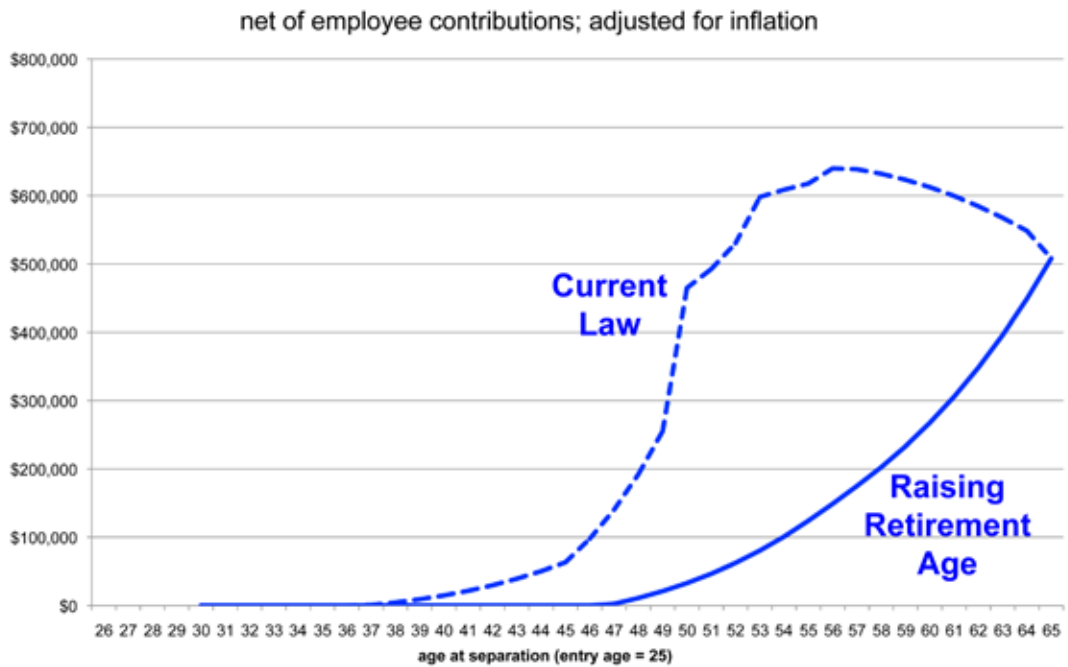
Returning to our Missouri example, suppose that state adopted a milder version of the Illinois reforms. Specifically, let the normal retirement age rise to 65 and early (age-reduced) retirement to 60, while eliminating the “rule of 80” and “25-and-out.” Even leaving the COLA unchanged, along with other recent enhancements, we see from Figure 6 that a 25-year-old entrant would not accrue positive net pension wealth until age 47. Thus, whatever difficulties the current system creates for recruitment of young mobile teachers would be exacerbated by such changes.

15 Illinois also previously had a feature which allowed for early retirement without penalty, upon payment of a lump sum. This feature, which was quite advantageous, was also eliminated for new hires.

16 The curve for the old law does not include the early retirement option described in the previous note.

17 Net accrual is actually negative, even if the early separator cashes out her contributions, because Illinois does not pay interest on employee contributions. If Illinois did pay interest, net accrual would be zero over this interval.

**FIGURE 6**  
**NET PENSION WEALTH, MO: RETIREMENT AGE = 65**



***Indexation of Final-Average-Salary***

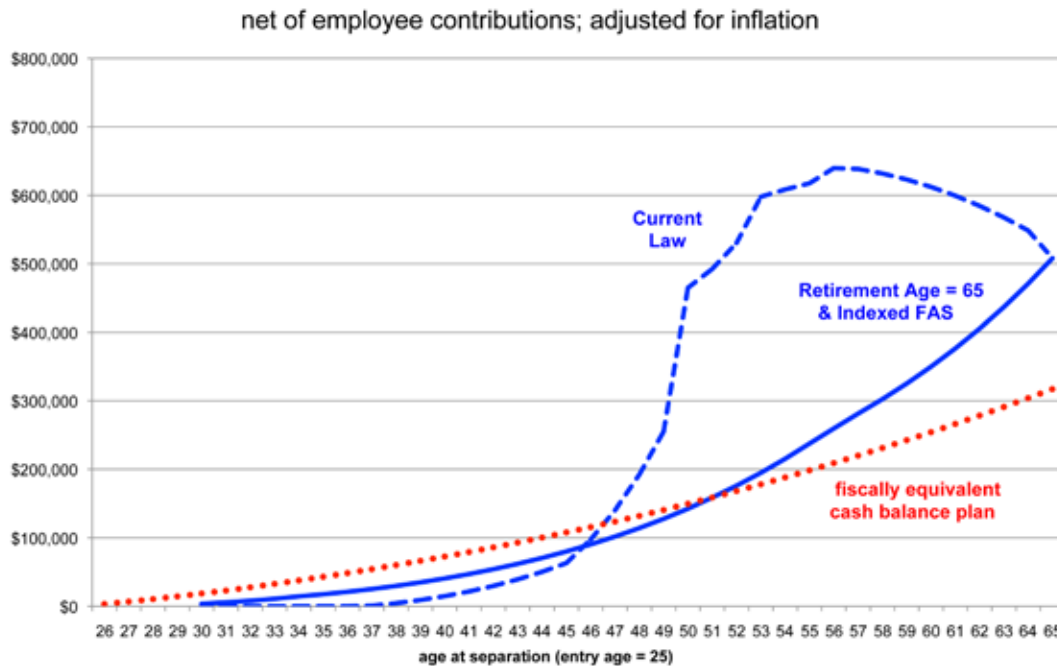
A key feature of traditional DB formulas that contributes to the back-loading of pension wealth accrual is the freezing of final average salary (FAS) at age of separation: inflation by the year of first draw erodes pension wealth for early separators. In principle, this problem can be fixed by indexing FAS to inflation (or general wage growth, as in the Social Security system). In practice, the only state that does this is South Dakota. Figure 7 continues our Missouri example, adding this feature to Figure 6’s assumptions (i.e. retirement age set at 65).<sup>18</sup> Indexation of FAS reduces the penalty for early separators, so net pension wealth is positive at a much younger age. Still, the system would be somewhat more back-loaded than the fiscally equivalent CB system, also depicted in Figure 7.<sup>19, 20</sup> Stated alternatively, the annual rate of accrual still rises as a percent of salary, while the accrual rate is constant under CB.

18 As noted earlier, the assumed rate of inflation is 2.5 percent.

19 The fiscally equivalent CB plan is calculated using the distribution of separations that are currently observed. These separations are weighted toward the mid-50s, although if the retirement age were raised, we would expect these weights to shift toward 65. Thus, the pension wealth of the average retiree along the solid curve would be higher and so would the truly fiscally equivalent CB curve. That is, the CB curve depicted in Figure 7 understates the advantage for early separators, and overstates the disadvantage for late separators, but the qualitative pattern is correct.

20 Diamond, Munnell, Leiserson, and Aubry (2010) point out that the FAS feature explains much of the remaining difference. If, instead of basing the pension on the final few years of salary, it were based on the full career with each year indexed prior to averaging (similar to Social Security), the accrual pattern would be similar to that of a CB plan. For this reason, Diamond et. al. recommend such an indexed career average design as an alternative to current public plans.

**FIGURE 7**  
**NET PENSION WEALTH, MO: INDEXING FAS**



**Alternative Manipulations of Final-Average-Salary Formula**

We have seen that it is possible to reduce, if not eliminate, uneven pension wealth accrual within the FAS formula by effectively mandating a later retirement age (e.g. 65) and indexing FAS. An alternative approach is to allow first pension draw at younger ages but to carefully specify a smoothly-varying array of age-reduction factors, or, equivalently, a multiplier that rises smoothly with age. These features are found in some states. Massachusetts, for example, has among the smoothest rising multipliers, rising from 0.1% at age 41 to 2.5% at age 65 and this feature, taken alone, does lead to relatively smooth accrual. If these features are implemented without enhancements such as “rule of 80” or “25-and-out”, they can smooth out spikes in pension wealth accrual.<sup>21</sup>

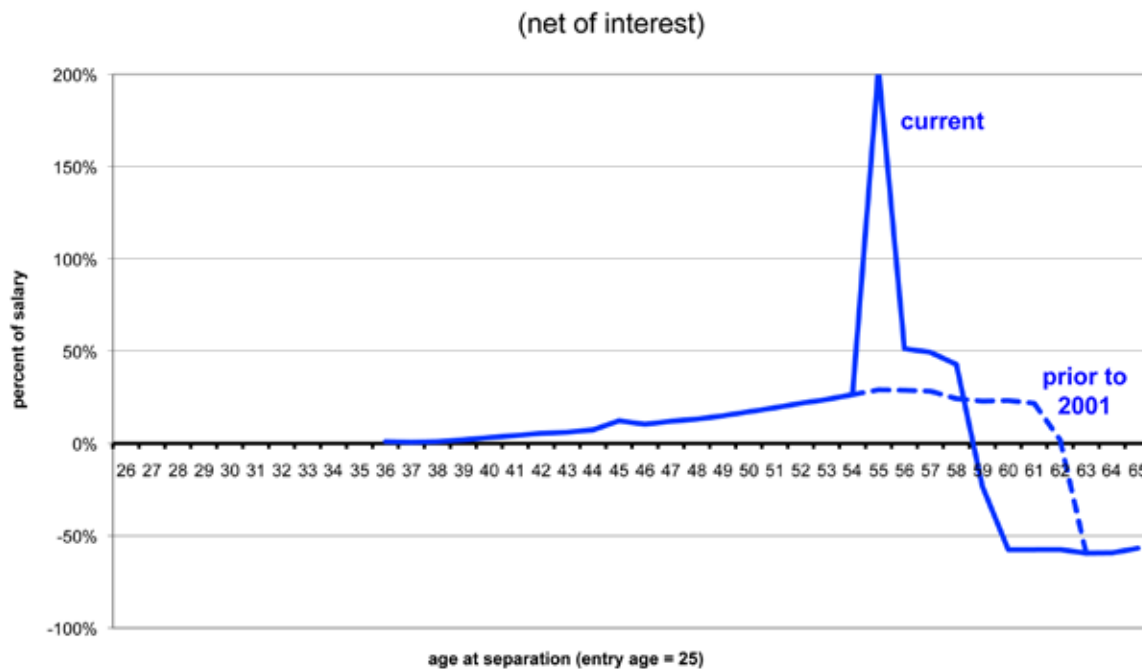
There are advantages and disadvantages to the age- or tenure-based multiplier approach versus the fixed-retirement-age-plus-indexing approach. One obvious advantage of the former approach is that it does readily allow for varying ages of retirement, rather than forcing those who genuinely want or need early retirement to juggle assets for liquidity (e.g. by borrowing against their future pension). Conversely, however, for those early separators who are not actually retiring, but switching to another job, the system may force one to draw the pension prematurely to maximize pension wealth; this also leads to asset juggling in the opposite direction, e.g. offsetting the premature pension draw by increased contributions on the new job to tax-deferred retirement accounts (if this option is available).

Another disadvantage of this approach is its complexity and consequent lack of transparency. Tables of age-reduction factors can be quite cumbersome (as they are in Ohio). Moreover, there will always be inequities in the distribution of benefits relative to contributions, since these formulas actuarially adjust forward for expected longevity, rather than backward for cumulative contributions. Since the former is based on age and the latter is based on service, the adjustment factors will not, for example, provide fair adjustment for educators with different entry ages.

<sup>21</sup> A weaker fix to spike-ridden formulas, adopted by many states, is to at least address negative accrual beyond the spike. This can be mitigated by measures that allow for post-retirement re-employment (including *ad hoc* measures such as “Deferred Retirement Option,” or DROP plans). This can allow teachers to maintain maximum pension wealth by “retiring” at the spike (i.e. drawing the pension, albeit in reduced form under DROP plans), while continuing to work. These measures, pejoratively referred to as “double-dipping,” are often politically unpopular, but lacking more fundamental reforms, can be seen as a rational response to an irrational system.

Perhaps the greatest disadvantage with either approach to manipulating the FAS DB formula is that they both invite further manipulation for pecuniary advantage, rather than rectification of perverse incentives (what economists would call “rent-seeking”). For example, the Massachusetts formula of gradually rising multipliers, which had applied equally to state employees and teachers, was enhanced for teachers in 2001, under heavy lobbying from the state teachers’ union, by inserting a large spike in pension wealth accrual at 30 years of service.<sup>22</sup> See Figure 8. California provides a similar example, with a relatively spike-less accrual pattern for teachers, due to an age-dependent multiplier, until enhancements enacted in 1999 also inserted a large spike at 30 years of service.

**FIGURE 8**  
**ANNUAL CHANGE IN NET PENSION WEALTH: MA**



In short, modifications to the basic FAS benefit formula designed to smooth accrual still leave the system vulnerable to the opportunistic behavior described above that has created the large pension spikes. Thus, these systems remain vulnerable to the peculiar labor market incentives, and the resulting efficiency costs arising from bunching of retirement at the pension spikes. In our view, this vulnerability to rent-seeking is exacerbated by the complex and seemingly arbitrary rules that constitute these formulas. If there is no transparent rationale for the table of age-reduction factors or for the age-structure of multipliers, then it is hard to fend off reasonable-sounding arguments to enhance these factors in various ways.

***Tying Benefits More Closely to Contributions***

If the goal is to smooth pension wealth accrual, in order to eliminate peculiar incentives and promote equity among different career paths, this is best done by tying benefits directly to contributions and clearly specifying that this is the underlying principle. Once the principle is accepted, there will remain alternative methods of implementing the concept, but the latitude for rent-seeking and gaming is much reduced.

<sup>22</sup> This was accomplished by adding  $2\% \times (YOS - 24)$  to the replacement rate, for  $YOS \geq 30$ . By way of disclosure, one of us (Costrell) served in the Massachusetts administration at the time of this enhancement and, along with other staff, recommended a gubernatorial veto, which was overridden by the legislature. An account of that episode can be found in Costrell and Podgursky (2007a).

It is commonly assumed that “tying benefits directly to contributions” is code language for shifting from defined benefit to defined contribution (DC). Indeed, much of the policy debate on public employee pension reform has focused on DB versus DC plans, typically with teacher unions and employee organizations digging in to protect the former and conservatives proposing the latter. It is true that DC plans avoid most of the problems we have listed above and permit smooth accrual of pension wealth. However, critics of DC plans object that such plans can run up large administrative fees and individuals can make poor investment choices. More generally, DC is widely considered to shift investment and longevity risks from the employer to employee. Some of these arguments may be debatable: administrative fees are low in some well-established DC plans that offer an array of investment funds to employees, including relatively risk-free funds (Clark and Richardson, 2010), some DC plans offer annuities and there are, in any case, annuity markets. But the point we wish to make here is that the policy space is richer than simply traditional DB plans, on the one hand, vs. DC plans on the other. “Tying-benefits-directly-to-contributions” is a broader principle than “tying-benefits-directly-to-contributions-and-possibly-risky-investment-returns-on-employee-selected-assets,” which is a fuller description of DC.

Our analysis of the educator labor market leads us to believe that a CB type plan deserves serious consideration.<sup>23</sup> CB plans are similar to DC plans, as employee and employer contributions accrue in notional retirement accounts, but the return on these accounts is guaranteed. They are legally considered DB plans, in part because the plan defines the return on assets. These plans provide smooth and equitable pension wealth accrual. They can be easily structured to remove penalties for mobility. They can also be made convertible to annuities, thus insuring against longevity risk in the same way as traditional DB pensions. Many of the remaining private sector DB plans have converted to CB, and others are poised to do so. One state, Nebraska, has switched from traditional DB to CB for all new state employees (but not for teachers). California offers an optional CB plan for part-time educators.

In addition, some teacher pension plans already carry features that are similar to CB plans under different names. Indiana, for example, has a hybrid plan with two parts -- a traditional DB plan and an “Annuity Savings Account” (ASA) with a guaranteed return. Other states (e.g. Wisconsin) have “money purchase” plans which effectively offer employees an alternative benefit to the FAS formula, based on the annuitized value of cumulative contributions, if the latter is greater than the former. South Dakota (alone among states, as far as we can tell) facilitates portability by allowing employees to withdraw employer contributions as well as employee contributions, along with interest, upon early separation;<sup>24</sup> this effectively offers employees the option of a CB-type retirement account, as an alternative to the traditional FAS formula.

As these examples illustrate, some states already have elements that can be built upon to strengthen the link between benefits and contributions, while other states can introduce such elements as part of a hybrid plan.<sup>25</sup> In our view, it would be best to go all the way to a pure CB-type plan, for reasons of equity, simplicity, and efficiency, but there is ample room in the nation’s policy space for plans that combine CB and/or DC-type elements (including supplemental plans) with reduced FAS plans and Social Security.<sup>26</sup>

All of these methods for tying benefits to contributions can enhance portability and reduce the incentive problems discussed above. They all offer superior benefits to teachers who leave employment before meeting traditional DB eligibility conditions. Similarly, as schools struggle to recruit and retain the best classroom teachers, it makes little sense to retain a system that pushes experienced and fully certified teachers into retirement in their middle fifties. This seems particularly misguided for STEM or special education teachers, where qualified replacements may be difficult for some districts to recruit.

23 Costrell, Johnson, and Podgursky (2009), Costrell and Podgursky (2010b). See also Aldeman and Rotherham (2010).

24 South Dakota recently shaved this benefit, reducing the maximum withdrawal of employer contributions from 100 percent to 85 percent.

25 For recent developments in state DC and hybrid plans see Snell (2010).

26 In choosing among various methods of tying benefits to contributions, states will of course need to consider the varying fiscal implications, notably the allocation of risk between employer and employee, and the associated asset allocation decisions. Several states are currently considering switching to DC plans precisely because they shift market risk to employees, and avoid entirely the problem of unfunded liabilities. Conversely, those who offer CB plans, with guaranteed returns on employee accounts, may choose to invest in risk-free assets, but need not do so. Nebraska, for example, uses the same asset allocation for its state employees’ CB plan as it does for its teachers’ DB plan. That asset allocation carries an assumed rate of return that exceeds the guaranteed return offered on CB accounts, but Nebraska enhances the guaranteed return as market returns allow.



Of particular concern are the harsh penalties for mobile teachers and administrators built into the current system. One important goal of school reform plans is to diffuse best practices. This can take the form of charter schools or reconstituted schools. Bringing in new school leadership is usually part of this package. The market for new leaders, whether teachers or administrators, should not be restricted to single states or districts. It is in the public interest to diffuse new ideas and best practice widely. This often involves diffusing people. A cash balance plan or similar plans with portability would facilitate such mobility.

Finally, to elaborate on a point made earlier, tying benefits to contributions makes it much more difficult for legislatures to indulge in the kind of creative pension formula rewriting that has led to the labor market irrationalities discussed in this brief and contributed to the funding crisis. Without such a unifying principle, we have instead a complex array of pension rules that are fairly arbitrary, and thus subject to arbitrary enhancements. These rules include the calculation of final average salary (highest five years vs. highest three years or even one year; pension based on salary alone, or benefits, too), the annual service multiplier (2.1 percent versus 2.3 percent), and the rules for eligibility to receive the pension (“rule of 80” vs. “rule of 85”; “25-and-out” vs. “30-and-out”, etc.). Since these rules are not tethered to any core principle, legislatures have, over the last several decades, been constantly tempted to enhance them, without clear indication to the public or to members lobbying for the benefits what the actual value of these enhancements were or the labor market implications.

## **CONCLUSION**

Retirement benefits represent a large and growing share of educator compensation. An important question is whether the dollars spent in current teacher retirement benefit systems are efficient from a teacher quality perspective. This brief examined the incentives built into typical state defined benefit plans and found them to be both inefficient and inequitable. Benefits are highly back-loaded, with large peaks in pension wealth accrual followed by valleys of negative accrual. These have the perverse effect of retaining teachers to a certain point (“pull”) and then pushing them into retirement beyond that point. As schools struggle to recruit and retain the best classroom teachers, it makes little sense to retain a system that pushes experienced and fully certified teachers into retirement in their middle fifties. The current systems also offer few, if any, benefits to teachers who leave much before reaching retirement eligibility. This allows employers to pay disproportionately larger benefits to career teachers, but at the expense of young teachers with a shorter teaching career in mind. In addition, the current systems impose very large penalties for geographically mobile educators, with no obvious efficiency rationale, and thus likely distort the applicant pool for school administrators. Our analysis of the educator labor market leads us to believe that plans that tie benefits more directly to contributions, such as CB plans and similar hybrids, deserve serious consideration.



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