How Pensions Contribute to the Premium Paid to Experienced Public School Teachers

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Abstract

Many argue that public school systems should stop linking teachers' salaries so closely to their years of experience. However, the effect of deferred retirement compensation on the premium paid to experienced teachers has, to date, been underappreciated. To shed more light on this issue, we calculate the total compensation earned by teachers in New York City and Philadelphia from both salary and deferred retirement compensation under each system's currently operating defined-benefit plan. Retirement compensation in both cities is backloaded, which substantially increases the premium paid to highly experienced teachers. In late-career years, teachers often earn a larger compensation premium from the accrual of pension benefits than from salary. We show that cash-balance retirement plans, which are less backloaded, would substantially reduce experience premiums without reducing the total compensation for the average entering teacher.

Introduction

The vast majority of public school teachers in the United States earn salaries according to a step-and-lane schedule that is a function of the number of years of experience and the number of advanced degrees they have attained. The single salary schedule persists despite a wide body of research demonstrating minimal relationship between teacher quality and experience after the first several years of employment.[1]

Of course, from an economics and management perspective any compensation system that pays a premium to employees for attributes that are not systematically related to performance is problematic. Consequently, while there remains considerable disagreement about how to structure an appropriate remedy, several researchers and policymakers have pointed to this research to argue for decoupling the relationship between salaries and experience (see for instance Hanushek 2007; Podgursky and Springer 2007; Rice 2013; Winters 2011).

In this paper we demonstrate that these arguments in favor of altering the relationship between experience and compensation have thus far understated the issue. Today's public school systems pay a much larger premium for experience than is currently appreciated in the academic literature or the broader policy conversation.

To date, researchers and other commenters have focused on the relationship between a teacher's experience and her salary. What has gone unappreciated is the effect of deferred

[1] Hanushek (1997, 2003) surveyed 206 estimates published prior to 2003 and found a consistent result of large returns to experience early in a teacher's career that plateau after only about five to seven years in the classroom. Subsequent papers have continued to report similar patterns (Clotfelter, Ladd, and Vigdor 2007; Rivkin, Hanushek and Kain 2005; Hanushek et al 2005; Gordon, Kane, and Staiger 2006). Some more recent estimates have identified substantial quality returns to experience gained in later-career years after accounting for sample selection (Harris and Sass 2011, Papay and Kraft 2015, and Wiswall 2013). However, even these recent papers do not dispute that the actual quality differences between more and less experienced teachers currently employed within schools plateau after the first several years in the classroom.

retirement compensation. The final-average-salary defined benefit pension plans (FAS DB) that cover the retirements of around 90 percent of today's public school teachers very often heavily backload retirement compensation late into teachers' careers.[2] Consequently, the total compensation premium earned by experienced teachers relative to younger teachers is often far greater than is commonly understood.

In fact, the structure of the pension system can lead to heavily backloaded total compensation even in cases where teacher salaries are not backloaded. Roughly half of American public school districts have salary schedules that have steeper increases for early career years, while the other half have steeper salary increases in later career years (Grissom and Strunk 2012). However, as we will show in this paper, in each of these cases the structure of the FAS DB retirement system results in large experience premiums that are often much bigger than the premiums earned as a result of the salary schedule.

Other research has illustrated the backloaded nature of teachers' retirement plans (Costrell and Podgursky 2009), that teachers respond to the incentives imbedded in these systems (Costrell and McGee 2010, Ni and Podgursky 2016), and that these incentives do not appear to be linked to increased workforce quality (Koedel, Podgursky, and Shi 2013). However this literature has not yet adequately described how the combination of salary and deferred retirement compensation evolves across the span of a teacher's career.

We calculate the total compensation resulting from both salary and deferred retirement compensation earned by teachers for each year of experience for two large urban school districts

[2] Defined benefit coverage taken from the Bureau of Labor Statistics' (BLS) National Compensation Survey, March 2015. See http://www.bls.gov/ncs/ebs/benefits/2015/ownership/govt/table02a.htm

-- New York City and Philadelphia.[3] Though there is variation in both the generosity and the exact structure of teacher retirement benefits across systems, these district plans contain features that are commonly found in teacher retirement plans nationwide. We demonstrate that both of these pension plans backload retirement compensation in a way that substantially increases the premium earned by highly experienced public school teachers relative to younger teachers. In late-career years, teachers often earn a larger experience premium from pension benefits accrual than from salary.

We then consider this experience premium under an alternative cash-balance (CB) defined benefit retirement plan in which teachers accrue pension benefits more evenly across their careers. We demonstrate that moving to a CB plan would substantially reduce the compensation premium tied to experience without reducing the total compensation that the average entering teacher can expect to earn throughout her career.

Our results contribute to the ongoing conversation about the disconnection between teacher compensation and performance in the classroom. Thus far, this conversation has not fully incorporated the role of retirement compensation, an important component of total compensation that is strongly related to experience. The primary contribution of this paper is to highlight the important role that deferred retirement compensation should play in these conversations, and to consider an alternative approach to the structure of current plans that would more evenly distribute compensation to teachers of different experience levels.

Backloading under Current Teacher Pension Systems

[3] Results for each of the ten largest U.S. school districts are presented in McGee and Winters (2015).

The substantial majority of public school teachers in the United States earn retirement benefits under a FAS DB structure. In these systems, teachers earn a lifetime annuity that can only be accessed once they reach their plan's retirement eligibility thresholds, generally a combination of age and years of service. The size of a teacher's starting annuity increases as they accrue more years of service in the same system and as their salaries increase. The dollar value of an employee's starting annual annuity for a given age at separation, a_s, and age at retirement, a_r, is given by equation (1) below. Annuity payments are assumed to commence at the beginning of a period.

$$B(a_r|a_s) = YOS_{a_s} * M_{a_r,YOS} * R_{a_r,YOS} * \left(1 - E_{a_r,YOS}\right) * FAS_{a_s} \quad (1)$$

In equation (1), B is the starting annual annuity beginning at age a_r given age of separation, a_s, M is the benefit multiplier, R is an indicator for retirement eligibility, E is the percent reduction for early retirement, YOS is the number of years worked for the plan sponsor, and FAS is final average salary.[4]

The present value of a teacher's retirement benefit, PVB, can be calculated at various ages of separation, a_s, using standard actuarial techniques.[5] For each a_s, the plan's rules may allow the employee to begin receiving an annuity immediately or may require that she defer until meeting the retirement eligibility thresholds. The present value of the employee's retirement benefit at any given age is given by equation (2) below. The equation calculates the maximum pension benefits an employee may achieve at each age, a_s.

[4] For teachers' salaries we use the master's degree lane from the relevant district's teacher salary schedule.
[5] The methods used here follow Costrell and Podgursky (2009), Costrell and Podgursky (2010).

$$PVB_{a_s} = \max_{\{a_r \in A | a_r \geq a_s\}} \left[B(a_r|a_s) * AF_{a_r} * f(a_r|a_s) * (1+r)^{-(a_r - a_s)} \right] \quad (2)$$

In equation (2), $B(a_r | a_s)$ is the starting annuity an teacher would begin receiving at age of a_r given that the teacher separated at age a_s (see equation 1); *AF* is the annuity factor and represents the value of a dollar of annuity beginning at age of retirement a_r; $f(a_r | a_s)$ is the conditional probability of survival from a_s to a_r, and r is the interest rate used to discount future cash flows.

In principle, PVB_{a_s} represents the cash value of the annuity a teacher has earned at age a_s.[6] The teacher should be indifferent between receiving the lump sum PVB_{a_s} and the annuity $B(a_r | a_s)$.

The present value of a teacher's retirement benefit can also be calculated net of employee contributions (i.e., isolating the portion of the benefit funded by the employer), PVB^{net}, shown in equation (3) below. *TotCont* represents cumulative employee contributions up to a specified age.[7] While teachers will be interested in the total benefit provided under the plan from a retirement income perspective, netting out the value of employee contributions provides a measurement of the employer funded benefit or retirement compensation. Looking at benefits net of employee contributions allows us to better understand how retirement benefits fit into

[6] For all present value calculations we use a nominal interest rate of 5 percent and an inflation rate of 2.5 percent. We use the mortality tables dictated for use under ERISA that are compiled and updated by the IRS. Specifically we use the 2013 static mortality table based on the RP-2000 Mortality Tables Report adjusted for mortality improvement using Projection Scale AA. The mortality table can be found at http://www.irs.gov/pub/irs-drop/n-08-85.pdf.

[7] Cumulative employee contributions were accumulated at the same nominal 5 percent interest rate used in present value calculations.

teachers' total compensation package. The remainder of this paper uses PVB^{net}, or retirement compensation, as the primary variable of interest.

$$PVB_{a_s}{}^{net} = PVB_{a_s} - TotCont_{a_s} \tag{3}$$

Under FAS DB systems, teachers generally earn the bulk of their retirement compensation very late in their careers. In these systems backloaded retirement compensation is the result of benefits that are based on teachers' last few years of pay and requiring benefit deferral until retirement eligibility without wage or inflation indexing. The magnitude of the backloading varies substantially across plans, and is often quite considerable (McGee and Winters 2013).

The benefits earned under teachers' retirement plans are the product of a complex combination of many factors, and as a result, it is both easier and more relevant to use real-world examples when presenting work on FAS DB benefits. We thus focus our analysis on two plans operating in major urban school systems that broadly illustrate the features found in many other plans nationwide: New York City and Philadelphia.[8]

New York City is an important plan to consider if only because it is the nation's largest public school district. In addition, the city experiences less early-career teacher attrition than do most other urban school systems.[9] One potential contributing factor to New York City's lower than average early-career turnover is that its retirement benefits accrue more evenly across teachers' careers (i.e., without as many jumps in value) and peaks later than is the case in many

[8] The pension parameters and assumptions for each system were gathered from retirement plan documents including Comprehensive Annual Financial Reports, Actuarial Valuations, and benefits handbooks. A description of each pension plan's parameters can be found in McGee and Winters (2013).
[9] A figure in the Appendix illustrates cohort survival rates in both New York City and Philadelphia.

other urban districts. Thus, our analysis of New York City's plan illustrates a less extreme case than many other cities. That, as we will see, the plan is nonetheless heavily backloaded, helps to illustrate the severity of the issue this paper considers.

We also present an analysis of Philadelphia's retirement plan. We choose Philadelphia because it has design features – sporadic spikes and drops in retirement wealth at certain career years – that are found in several other cities. Thus, Philadelphia serves to illustrate the implications of the highly uneven benefits accrual typical of FAS DB plans found in many other areas across the nation.[10]

The solid lines in Figure 1 illustrate the net present value of retirement benefits in each year under Philadelphia's and New York City's current FAS DB systems for a 25-year-old teaching entrant. Though the specific values differ between the two systems, there are important similarities in the structure of these pension plans, which are broadly reflected in other school systems as well.

[FIGURE 1 ABOUT HERE]

For both systems, we model the benefits tier currently in place for new hires. It is worth noting that in recent years several states have adopted changes to their benefit plans that affect new teachers but not previously hired teachers.[11] These changes have generally resulted in less generous benefits that peak later in a teacher's career, reducing the magnitude of the

[10] See McGee and Winters 2013 for an analysis describing wealth accrual under the pension plans operating in the 10 largest US school districts.

[11] See National Conference of State Legislatures' (NCSL) Pension and retirement State Legislation Database (http://www.ncsl.org/research/fiscal-policy/pension-legislation-database.aspx) and National Council on Teacher Quality (NCTQ) report titled "No One Benefits" (http://www.nctq.org/dmsView/No_One_Benefits_Teacher_Pension_Systems_NCTQ_Report).

compensation premium paid through the retirement system. Thus, we argue that our results are quite conservative for the relationships under consideration.

The basic structure of pension benefits in Philadelphia and New York City is one of "peaks and valleys" (see Costrell and Podgursky 2009). In both cities, teachers do not vest in their retirement plan—and therefore do not earn any retirement compensation—until they have worked in the district for ten years. After ten years, teachers see gradual increases in their retirement compensation, and then at around 25 years of service, teachers rapidly accrue much more valuable retirement benefits. In New York City for example, a teacher earns an average of about $1,031 in retirement compensation during each of her first 15 years of service; while in each of the 15 ensuing years, she earns $16,908, on average. We refer to retirement plans that exhibit this pattern, whereby teachers earn relatively meager pension benefits through much of the early and middle portions of their careers and then much more valuable benefits late in their careers, as being backloaded.

In both Philadelphia and New York City, retirement benefits decline rapidly after forty years of service. At this point our example teacher is eligible to retire immediately, so each additional year spent in the classroom is a year she does not receive her retirement annuity. The value of her retirement benefits declines because her annual benefit is not increasing fast enough to offset this missed pension-year.

Backloaded Retirement Compensation and the Premium Paid for Teaching Experience

An underappreciated consequence of backloaded retirement compensation is that it substantially increases the premium earned by higher experienced teachers. This section uses the

examples of New York City and Philadelphia to highlight the important contribution that retirement compensation makes to teacher experience premiums. The patterns found in these two districts are found in many other districts nationwide. In fact, benefits under New York City's plan accrue somewhat more evenly and peak later than many of the retirement plans offered by peer districts, meaning that the reported results are actually quite conservative.

For the purposes of this paper, total compensation is the combination of salary and deferred retirement compensation. Teachers' salaries derive directly from their school district's salary schedule. For simplicity, we restrict our analyses to the salary schedule lane for teachers with Master's degrees.[12] The retirement compensation that a teacher earns in a given year is equal to the difference between the value of her benefits at the end of prior year and the end of the current year (i.e., year-over-year change in net present value). In all figures and analyses retirement benefit calculations are made for a female teacher who enters the school system at age 25.

For each year of service, Figure 2 deconstructs the total compensation deriving from salary and retirement benefits earned by an example New York City public school teacher.[13] The lighter grey area represents compensation in the form of salary according to the salary schedule. While the darker grey area represents the value of retirement compensation. The areas in the figure are cumulative, and so total compensation is represented as the sum of the two areas. For instance, in her 20th year of service our example New York City teacher earns a salary of

[12] Benefit structures are similar for those without masters' degrees, though the specific amounts will differ because of the lower salary for being on that rung on the salary ladder.
[13] Total compensation also includes health care benefits. However, health care benefits are the same for teachers at any year of service and thus do not affect the compensation premium that the teacher earns.

$95,202 (represented by the light grey area) and experiences a $16,892 increase in the value of her pension benefits (represented by the darker grey area), for total compensation of $112,094.

[FIGURE 2 ABOUT HERE]

Early in a New York City public school teacher's career, annual compensation increases derive entirely from moving up the salary scale—teachers, as mentioned, do not vest into the pension plan for ten years and thereafter do not become eligible for meaningful retirement compensation until reaching that threshold. However, once a New York City teacher reaches her third decade of teaching, retirement compensation rises rapidly. After year 22, our example New York City teacher's salary no longer increases because she has reached the top of the salary schedule. But at the same time, she has reached the steep portion of the retirement compensation curve (see Figure 1) and she begins to rapidly accrue retirement benefits. In these later years, annual deferred retirement compensation can grow quite large relative to salary. In her 36th year, our example New York City teacher earns $100,049 in salary and experience a $49,936 increase in the net present value of their retirement benefits.

Figure 3 shows that this general story holds true for teachers in Philadelphia, though some of the specifics are meaningfully different. Philadelphia public school teachers hit the maximum step on the salary schedule after only ten years of service. Our example 25-year-old entrant earns no retirement compensation until her 17th year in the classroom. Then suddenly she accrues much more valuable retirement benefits over a few particular years. For instance, she earns an additional $7,716 of deferred retirement compensation in her 24th year of employment and then $102,975 in her 25th year. The large spikes in retirement compensation in particular

years are not unique to Philadelphia, and are the result of age and service eligibility thresholds that, once reached, qualify teachers to retire earlier and/or with more generous benefits.

[FIGURE 3 ABOUT HERE]

In a teacher's early years, the experience premium she earns is almost entirely due to differences in take-home salary. Beginning in year 20 (New York City) and year 25 (Philadelphia), deferred retirement benefits begin to make up a significant share of the experience premium. In later years, the portion of the experience premium deriving from retirement compensation often is larger than that deriving from salary. For instance, relative to a tenth-year teacher, a thirty-fifth year teacher earns about 27 percent higher wages in New York City and earns the same wage (a 0 percent premium) in Philadelphia. However, taking into account deferred retirement compensation, the differences in total compensation between those teachers is 79 percent in New York City and 162 percent in Philadelphia. Such large differences in compensation exist despite no substantial evidence of a significant difference in the average performance of teachers at these different experience levels.

Interestingly, Figure 3 shows that salary increases in Philadelphia are actually quite consistent with prior empirical estimates of teacher quality returns to experience. As previously described, prior literature suggests that there are quality returns to experience in the first five to ten years in the classroom. Similarly, Philadelphia teachers receive wage increases in each of their first ten years, and then max out on the district's salary ladder. That the wage experience premium in Philadelphia is consistent with prior teacher quality research only further highlights the influence of retirement compensation on the experience compensation premium. That is, our analysis suggests that due to the structure of retirement compensation, total teacher

compensation in Philadelphia is still considerably backloaded, even though the structure of salaries is not.

The checkered area in the figures highlights the fact that the value of teachers' retirement benefits actually declines after a certain point in their careers - after about 40 years in both New York City and Philadelphia. A teacher's benefit loses value when she is eligible to retire immediately and the annual increase in her benefit is not enough to offset the amount she loses by continuing to work rather than collecting her annuity. Thus, one effect of the FAS DB structure is that teachers who remain in the classroom after the plan's specified "normal" retirement age are in fact teaching for pennies on the dollar. As a consequence, highly experienced teachers have a clear incentive to leave the classroom (Costrell and Podgursky 2009). Once they reach retirement eligibility, experienced teachers would generally do better financially to retire with their current employer and either not work at all or perhaps take another job. Prior research suggests that teachers respond to the financial incentive to leave when they reach retirement eligibility (see for instance Costrell and McGee 2010).

An Alternative Retirement Plan – Cash Balance

We have thus far explained how the backloaded nature of FAS DB plans dramatically increases the teacher-experience premium. This section considers the teacher-experience premium under an alternative cash-balance (CB) pension plan of equivalent cost to taxpayers and expected value for entering teachers.

Though there are many potential alternative retirement plans, including Defined Contribution plans similar to a 401(k), we choose to illustrate the implications of moving to a CB

plan because it allows us to change how teachers earn benefits across their careers without changing other features of the plan. Like the current systems, a CB plan is a defined benefit system. It offers the same investment and longevity protections as does the current FAS DB plans, and the benefits are similarly paid as an annuity (i.e. lifetime monthly payment). The only difference between the FAS DB plans and the cost-equivalent CB plans considered in this paper is a redistribution of deferred retirement compensation within teachers' careers. Thus, since it otherwise has the same features, the CB plan offers a unique way to consider the experience premium implications of altering the structure of teacher retirement compensation while maintaining the annuitized defined benefit structure of the current system. Though five states offer CB plans to some public workers, we are aware of none that offer this type of plan to teachers (Pew and LJAF 2014); however, CB plans have been considered by policymakers in several states and are likely to continue to be part of a broader reform discussion.

We compare retirement compensation under the FAS DB systems described previously with a cost equivalent cash balance systems that have a smooth accrual pattern across teachers' careers. By smooth we mean that retirement compensation at each point in an employee's career is a constant percentage of cumulative earnings.[14] For each district we calculate the average expected benefit for an entering teacher under the current structure and use that value to determine the accrual rate for the cost equivalent cash balance system. In pension parlance, the employer contribution percentage in our cost equivalent cash balance system is equal to the employer normal cost of benefits calculated using the Entry Age Normal method.

[14] In practice the cash balance plan we model is equivalent to a plan where cumulative retirement compensation is equal to the accumulated employer contributions and interest, in our case 5 percent.

The employer contribution percentage is calculated by dividing the expected value of future retirement benefits at age of workforce entry by expected cumulative wages. The cash balance system modeled in this paper has employer contributions equal to the employer contribution percentage and annual guaranteed interest on those contributions is equal to the interest rate used to discount liabilities, 5 percent in our case.

Equation (4), the numerator of the employer contribution percentage formula, calculates the expected value of retirement benefits standing at entry age, a_e, where $g(a_s)$ represents the separation probability distribution for a given entry age.[15] The summation extends to the last possible age at which an employee might separate from employment, a_z.

$$\mathrm{E}_{a_e}[PVB^{net}] = \sum_{a=a_e}^{a_z} PVB_a^{net}(1+r)^{-(a-a_e)} * g_{a_e}(a) \tag{4}$$

Equation (5), the denominator of the employer contribution percentage formula, calculates the expected cumulative wages for a worker entering employment at age a_e.

$$\mathrm{E}_{a_e}[CCW_e] = \sum_{a=a_e}^{a_z} CW_a * (1+r)^{-(a-a_e)} * g_{a_e}(a) \tag{5}$$

Equation (6) represents the employer contribution percentage, the constant percentage cumulative wages that results in a smooth accrual pattern that is cost equivalent to the current backloaded FAS DB accrual pattern given a particular separation probability distribution.

[15] The separation probability function, g(), is estimated using the decrement tables reported by each plan in their plan documents (e.g., actuarial valuations and comprehensive annual financial reports). Retirement plan actuaries are concerned with accurately predicting plan cost, and so these decrement tables represent separation hazard rates based on historical plan experience.

Equation (6) is simply the quotient of equation (4) and equation (5). It is important to note that the employer contribution percentage is specific to a particular entry age.

$$EC_{a_e} = \frac{E_{a_e}(PVB^{net})}{E_{a_e}(CCW_e)} \tag{6}$$

The dashed lines in Figure 1 compare the present value of retirement benefits under the current FAS DB and respective cost-equivalent CB systems in New York City and Philadelphia. Unlike the current system where pension benefits are backloaded, under the CB systems teachers accrue benefits much more evenly across their careers. Consequently, under the CB system teachers earn more valuable pension benefits earlier in their career than they would under the current FAS DB system.

However, teachers earn substantially less retirement compensation in late-career years where the value of benefits under the current FAS DB system peaks. That is because the CB system does not redistribute retirement compensation away from those teachers who exit the school system in the early or middle portions of their careers toward those teachers who remain employed there for the entirety of their careers. That is, the cost-equivalent FAS DB system can only provide more valuable benefits to teachers who remain under the same plan for a full career to the extent that it decreases the retirement compensation of teachers who exit the system earlier.

Though beyond the scope of this paper, it is reasonable to suspect that such a substantial change in the distribution of retirement benefits across teachers' careers would have implications beyond reducing the experience premium for both teachers and school systems. From a teacher's perspective, changing to a CB system would mean substantially reducing the maximum value of

the retirement benefits she could potentially earn around her current plan's retirement eligibility thresholds, but in exchange she would earn more valuable benefits earlier in her career thereby reducing the probability she leaves before earning a meaningful retirement benefit. McGee and Winters (2014) demonstrate that any rational risk-averse entering teacher would have a preference – often a very strong preference – for the more even distribution of retirement compensation presented by the CB plan relative to a respective FAS DB plan of equivalent value.

School systems, on the other hand, might worry that changing to a CB system could result in problematic changes in teacher attrition. Separated from the issue of cost, school systems might prefer a retirement structure that, together with other elements of compensation, maximizes the quality of the teaching workforce. From that perspective, a potential benefit of the current FAS DB structure is that it gives mid-career teachers a strong incentive to remain within the system in order to acquire the large payouts in late-career years. The smoother design of the CB plan, however, would reduce the financial penalty mid-career teachers face if they leave the classroom, thus potentially increasing turnover and harming teacher quality when they are replaced with less experienced teachers.

Podgursky and Ni (2016) measure changes in teacher attrition patterns related to changes in the distribution of retirement compensation. In a recent simulation, McGee and Winters (2016) apply those estimates and find that moving from a FAS DB to a cost-equivalent CB plan would be predicted to have only a slight impact on mid- and late-career teacher attrition. The simulation goes on to show that such a change would thus be expected to have little to no effect on teacher quality in the short or long run. This result is similar to the empirical findings of Koedel et al. (2013).

Compensation Premium Paid For Experience Under a Cost-Equivalent CB System

This section analyzes the premium paid for experience under a CB plan with the same expected value as the respective current plan. Figures 4 and 5 illustrate the distribution of salary and retirement compensation in each year under a CB plan, similar to Figures 2 and 3. Unlike the variable and seemingly arbitrary pattern of retirement compensation under the respective FAS DB system, the figures show that under a CB system pension benefits contribute a relatively consistent amount to the total premium paid for experience. Retirement compensation increases with teacher's salary, but exhibits little of the arbitrary peaks and valleys of the current system.

In each system the CB plan substantially reduces the premium paid for experience in the form of deferred retirement compensation relative to the respective current FAS DB plan. This occurs because the CB plan spreads a teacher's retirement compensation more evenly across her career than does the existing FAS DB plan.

Discussion and Conclusion

In this paper we have used information from two illustrative school districts' current salary schedules and pension plans to illustrate the distribution of total compensation across a teaching career. Our primary contribution is to demonstrate that deferred retirement compensation substantially increases the premium that public school systems pay for more experienced teachers. We suggest that this experience premium is much larger than has thus far been appreciated in policy discussions. We then consider a cost-equivalent alternative retirement benefit distribution that would substantially reduce the premium earned by more experienced teachers.

Our results contribute to the ongoing conversation about the wisdom of using compensation systems that strongly link teacher pay to experience levels. Current FAS DB retirement systems backload compensation in a way that is not consistent with empirical estimates of the relative quality differences between more and less experienced teachers. Current retirement systems thus further exacerbate the already weak link between teacher effectiveness and compensation to an extent that has not yet been fully appreciated.

One way to decrease the premium paid for teaching experience is to adopt a retirement benefit structure by which teachers earn benefits more evenly across their careers. We demonstrate that adopting a cost-equivalent cash-balance plan would substantially reduce the premium paid to experienced teachers while continuing to offer teachers a meaningful, secure benefit within a defined benefit structure. Such a system would better align teacher compensation to teacher quality by increasing the amount that school systems compensate teachers in their first several years in the classroom when research suggests they are making their most substantial quality improvements. The plan we consider is cost-equivalent to the school system and offers teachers the same investment and longevity protections as their current pension plans.

Whether or not decreasing the premium paid to experienced teachers would have an impact on educational outcomes is an open question worthy of future research. McGee and Winters (2016) suggests that moving to a CB system would be expected to have little to no impact on teacher quality due to changes in teacher attrition behavior. Grissom and Strunk (2012) find higher educational outcomes in school systems with more compressed wage schedules, though it is not entirely clear whether this would also translate to more compressed deferred retirement compensation distributions. Future work evaluating the implications of

retirement benefits structure on teacher quality would add considerable value to this conversation.

It is also worth considering retirement compensation from the teacher's perspective. McGee and Winters (2014) show that any risk-averse entering teacher should have a strong preference for a cost-equivalent CB plan relative to a FAS DB plan because participating in a CB plan substantially increases the likelihood that they will earn a meaningful retirement benefit by the time they decide to leave the classroom.

Thus, at worst it appears that such a policy change would benefit entering teachers at no taxpayer cost and, as the results of this paper show, would better align teachers' total compensation with real differences in quality over the course of teachers' careers.

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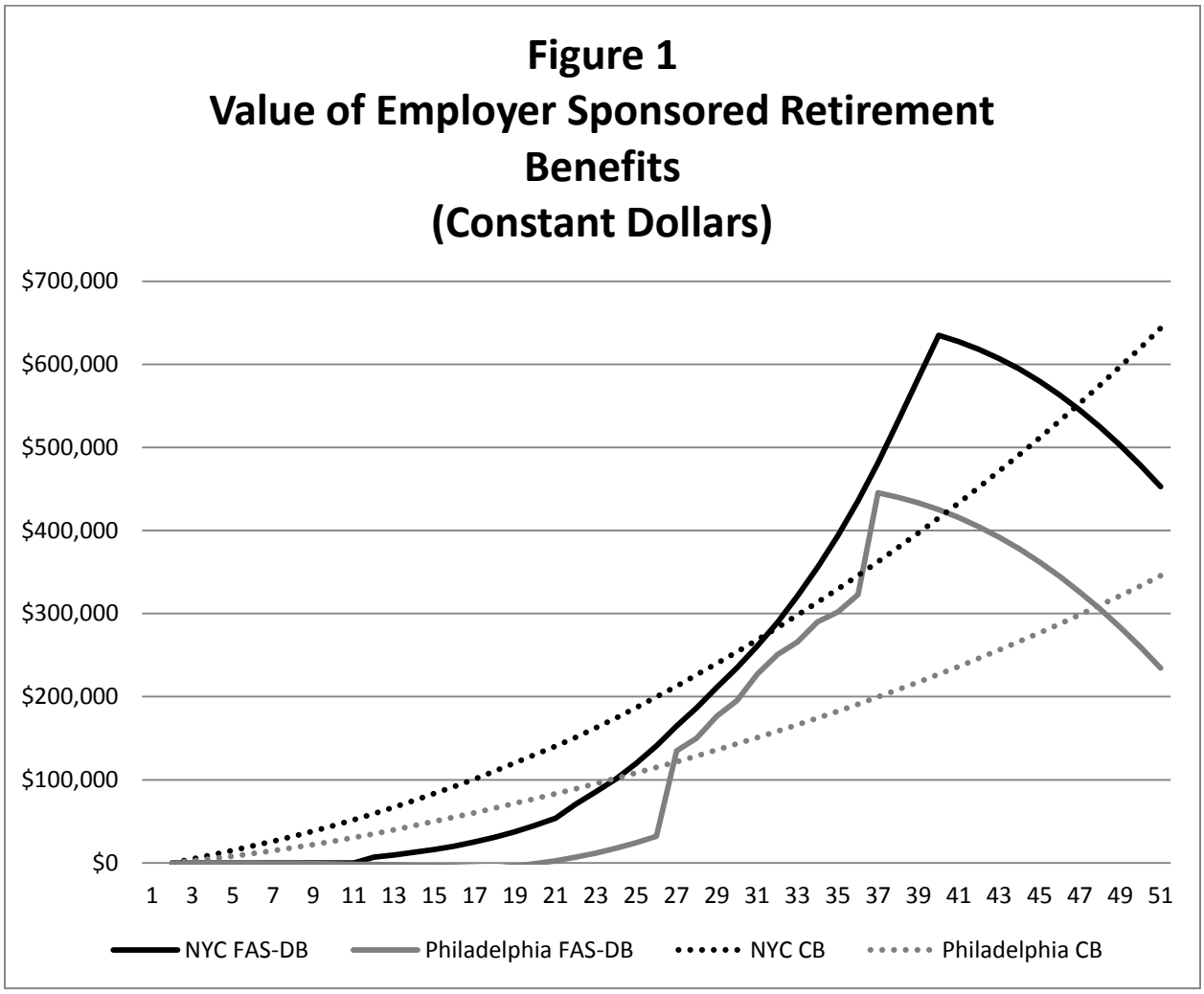
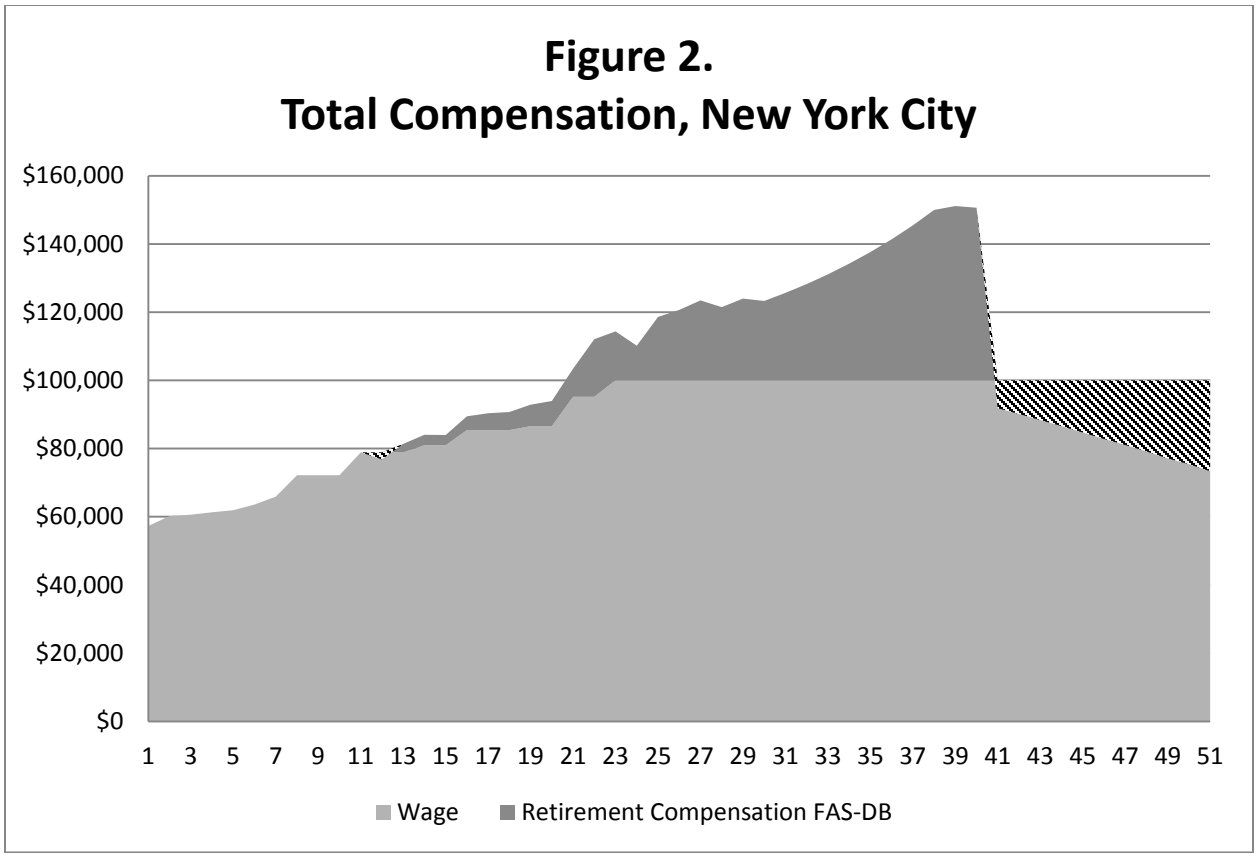
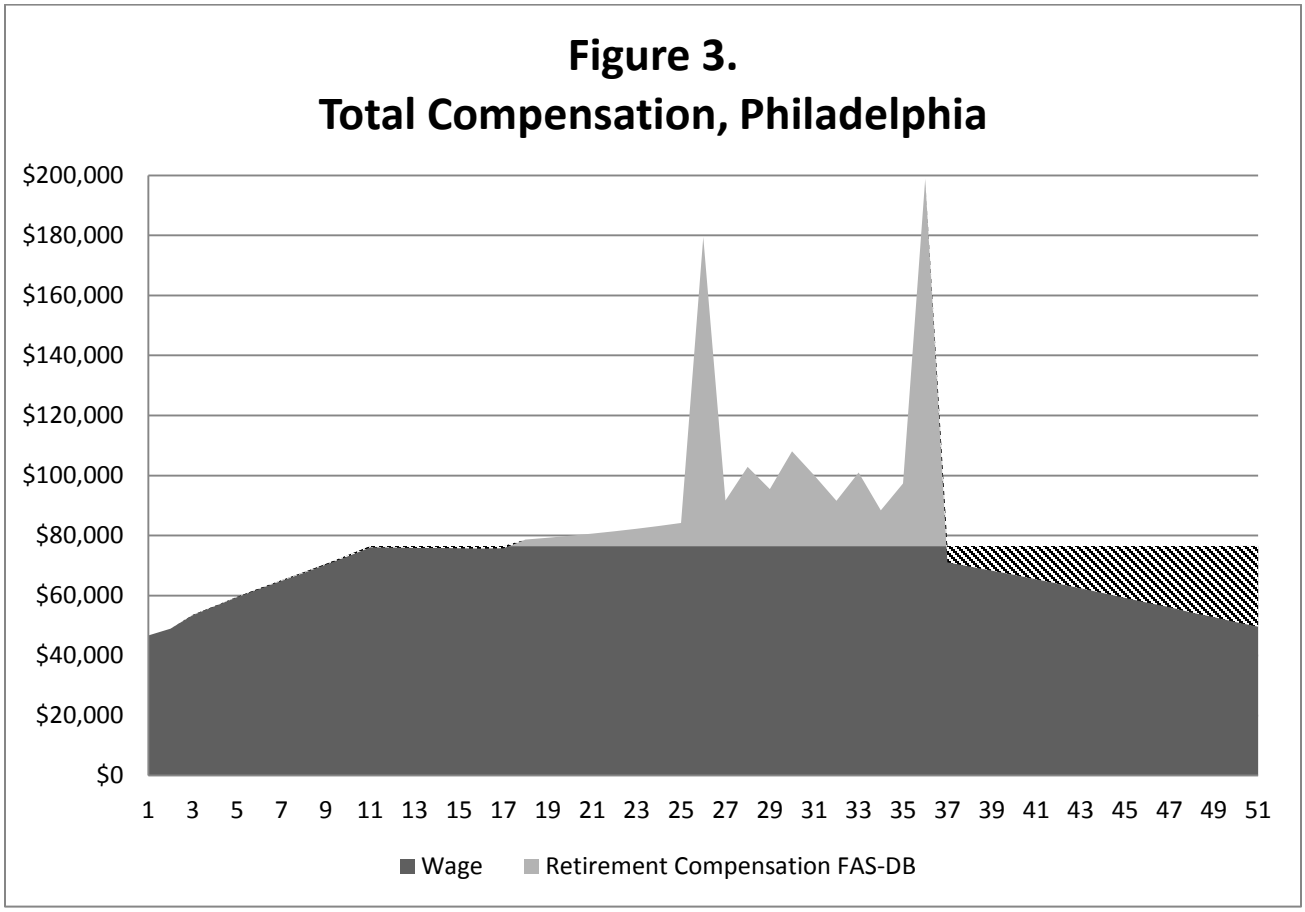


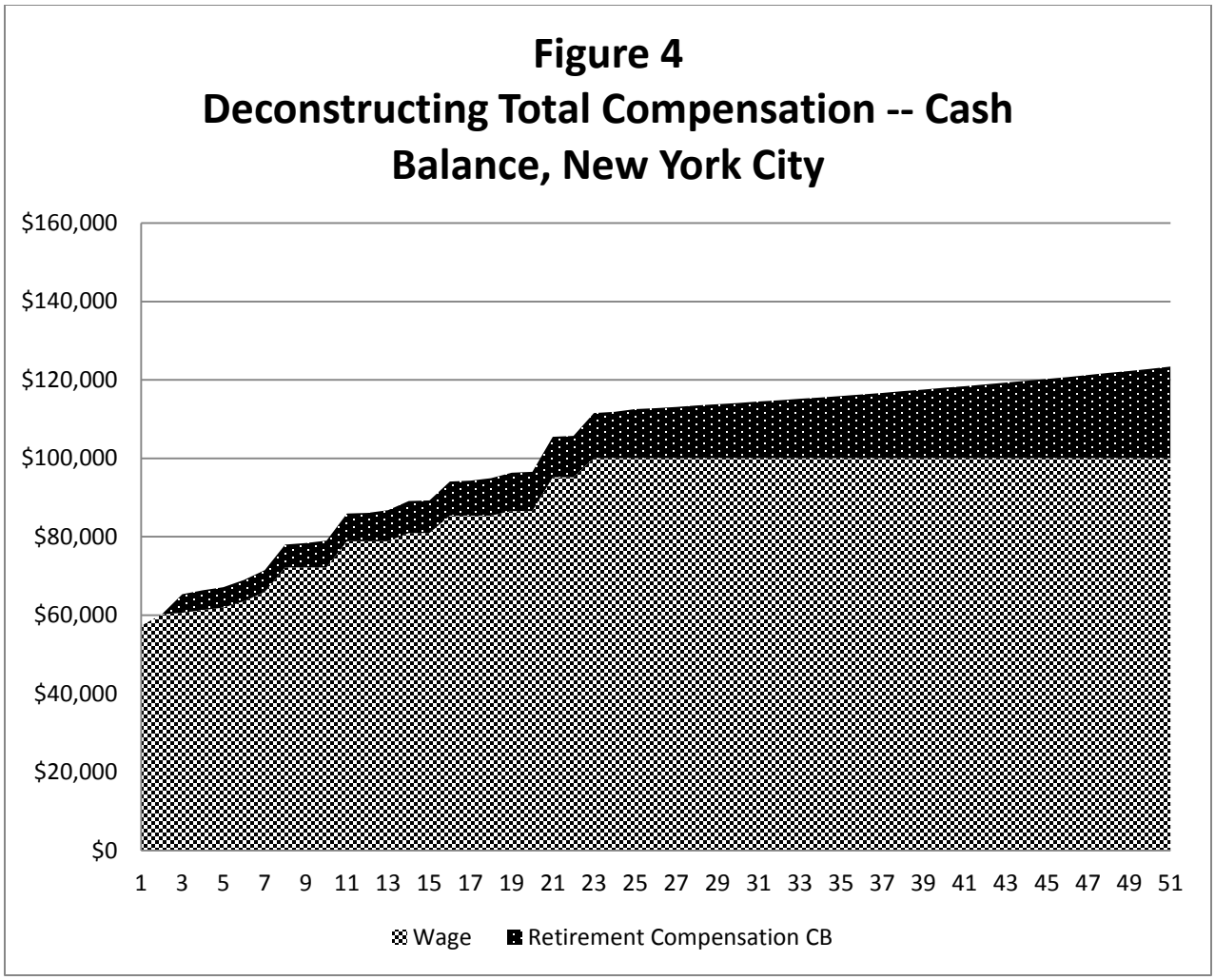
Figure 1
Value of Employer Sponsored Retirement Benefits
(Constant Dollars)
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
NYC FAS-DB
Philadelphia FAS-DB
NYC CB
Philadelphia CB



Note: Figure illustrates independent contribution of salary and present-value of dollars accrued in retirement compensation, during each year of service. The lighter portion represents salary. The darker portion represents the difference in present value of retirement wealth from previous year. The checkered area represents the portion where retirement wealth accrual is negative, and thus decreases total compensation.



Note: Figure illustrates independent contribution of salary and present-value of dollars accrued in retirement compensation, during each year of service. The darker portion represents salary. The lighter portion represents the difference in present value of retirement wealth from previous year. The checkered area represents the portion where retirement wealth accrual is negative, and thus decreases total compensation.



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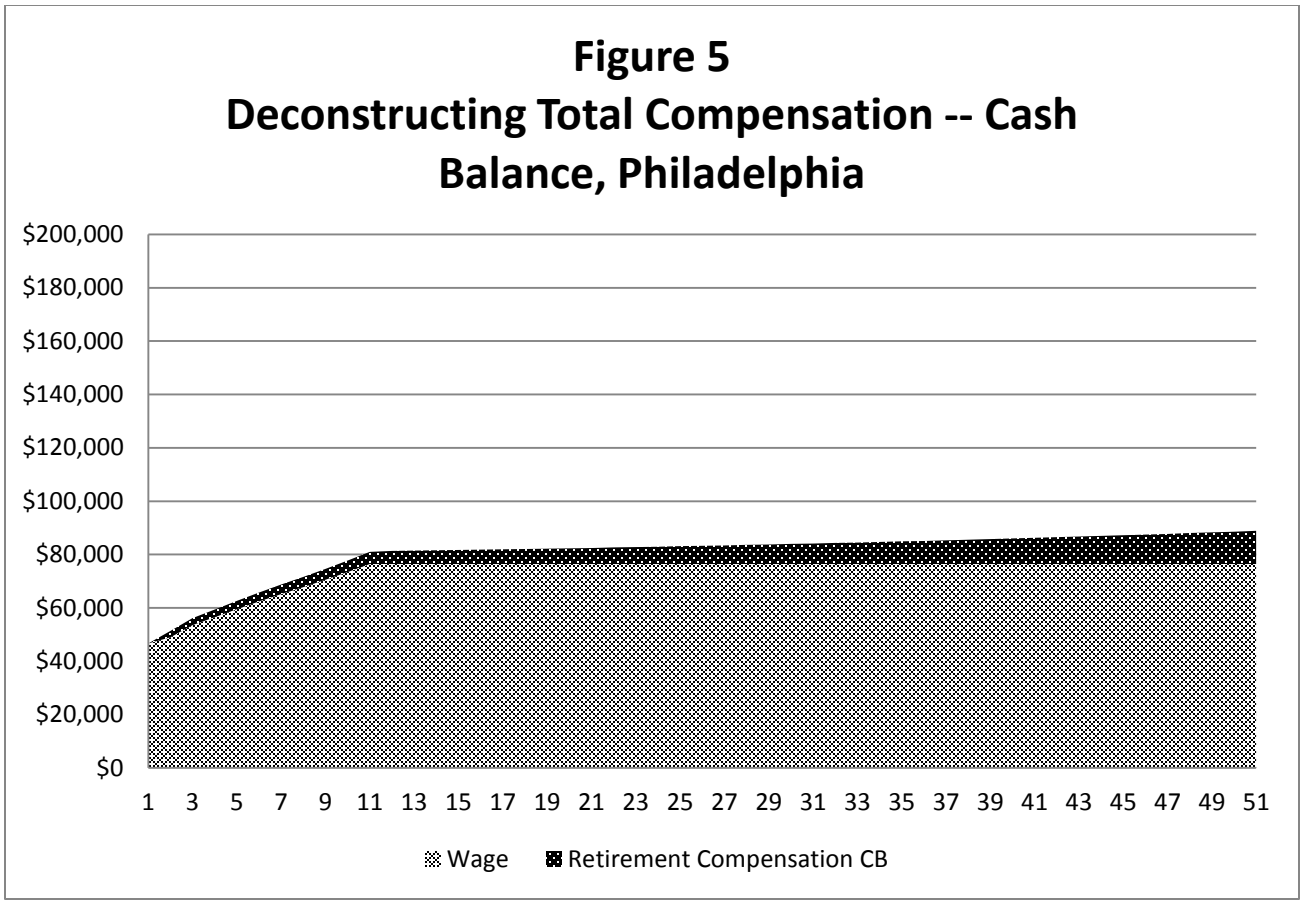

Note: Figure illustrates independent contribution of salary and present-value of dollars accrued in retirement compensation, during each year of service. The lighter portion represents salary. The darker portion represents the difference in present value of retirement wealth from previous year.

Appendix Figure