



TEACHER PENSIONS IN WEST VIRGINIA

How They Affect Taxpayers and Teachers

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EXECUTIVE SUMMARY

On Funding for the Teachers' Retirement System

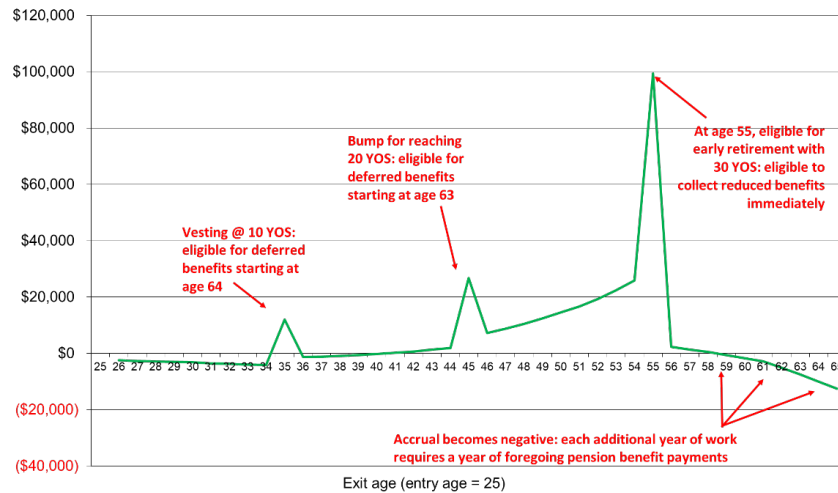
- Since at least the 1980s, TRS faced significant funding challenges and enormous unfunded liabilities. The state has taken various actions to deal with these funding issues, including changing retirement plans and devoting new revenue to reducing pension debt. By its own measures, the funded ratio for the plan increased from 11 percent in FY 1991 to 71 percent in FY 2019.
- Although funding has improved over the last three decades, retirement costs have increased. Between FY 2000 and FY 2019, the total cost of the plan increased from 23.9 percent of payroll to 31.3 percent.
- Increasing retirement costs cut into resources available for classrooms. In FY 2000, employer costs in real (inflation-adjusted) dollars were \$1,170 per pupil. This cost represented 11 percent of current expenditures per pupil for West Virginia public schools. Employer costs per pupil increased by 34 percent in FY 2019 to \$1,564 per student or 13 percent of resources directed towards public school classrooms.
- West Virginia continues to pay for a funding situation created decades ago. Rising costs, pushed onto future taxpayers and students, are driven by unfunded liabilities.
 - In FY 2000, 91 percent of employer costs paid down unfunded liabilities while just 9 cents of every dollar were directed toward pre-funding future benefits accrued by employees for their work during that fiscal year (normal costs).
 - By 2019, these shares converged slightly where 82.5 percent of employer contributions went towards paying down unfunded liabilities while just 17.5 percent of contributions were for normal costs.

On Benefits for Teachers

- Pension wealth accrues in a complex and highly nonlinear manner, which disproportionately benefits a minority group of teachers. These accrual patterns create strong “pull” and “push” incentives that occur at arbitrary points in a representative teacher's career, which occur at ages 55 and 57, respectively. These incentives are based on arbitrary rules and do not account for teacher quality or teachers' different life circumstances. The graph below illustrates these incentives where each point represents the change in net pension wealth from the prior year for a given year of work.

Year-Over-Year Change in Net Pension Wealth for Representative Female Teacher in West Virginia

(net of contributions, adjusted for inflation)



- More than half of an entering teacher cohort will leave the retirement system when net pension wealth accrual is negative. That is, for these teachers, the value of their pension benefit is less than their cumulative contributions when they leave the system.

Suggestions for Pension Reform

1. Directly link benefit costs with contributions.

Because benefits under DB plans are determined by formulas independent of contributions and therefore must be pre-funded, many proponents of pension reform argue for defined contribution (DC) plans to mitigate risk of underfunding.

2. Increase pension portability for all teachers.

The pandemic spurred increased interest in alternative educational options. With the introduction of new educational innovations, such as learning pods, and growth in student enrollment in nonpublic settings, such as private schools and homeschooling, new opportunities for teachers are emerging in alternative settings. Increased portability will make these transitions smoother and reduce fiscal penalties that young teachers, cross-sector movers, and early-leavers may face.

3. Pension benefits should accrue in a smooth manner, and retirement eligibility should not be based on arbitrary ages or tenure.

Pension plans that base retirement eligibility on age and years of service generate exceedingly strong incentives for teachers to stay or leave at arbitrary points in their career. We see such incentives embedded in TRS's plan. A plan designed so that benefits accrue in a smooth manner would be more fair for all teachers and remove fiscal penalties that the current plan imposes on mobile teachers.

4. Insulate pension plans from strong political incentives to push costs onto future generations of taxpayers, teachers, and students.

Politicians face strong incentives to push funding responsibilities onto future generations, which also increases risk for financial crises to materialize. Moreover, DB plans lack transparency and mask the true costs of these plans, which only serves to push costs onto future taxpayers. Shifting to a plan that directly ties contributions to benefit costs would help mitigate these problems.

INTRODUCTION

The Coronavirus pandemic has tested and stressed public school systems everywhere and compelled parents, education leaders, and lawmakers to reexamine the resiliency of these institutions. In response to this crisis, West Virginia passed the Hope Scholarship Program and leads a stream of states this year that enacted new educational choice programs or expanded currently existing programs. Although expanding educational opportunities for families is a necessary condition for improving how the state provides K-12 education, an important question relates to another area of the education system and directly to teachers, who remain very important to educating students enrolled in schools: do these systems work for all teachers? The answer depends where you look, but one important yet often overlooked area is retirement benefits.

There are two key issues that face teachers and the retirement systems they enroll in: how states fund retirement plans and how benefits are distributed among different groups of teachers.

The state took efforts over the last couple decades to improve the plan's financial footing by making up payments to pay down unfunded liabilities. While steps taken were difficult and commendable, they likely won't be enough. They also come at a cost to teachers and students who entered the picture long after funding was a problem and highlight equity concerns that often afflict defined benefit plans.

How these plans distribute benefits across different teachers deserves more attention. Given that incentives underlying these plans affect retirement behavior, it deserves a closer look. This paper analyzes West Virginia's pension plan for teachers from a labor market perspective, how pension benefits accrue for West Virginia teachers, and how their underlying incentives are structured to influence arbitrary points of separation.

This paper is organized as follows: the next section discusses how defined benefit plans work, costs associated with the teachers' pension plan, and the distribution of the plan's costs. Then the paper shows how pension benefits accrue under the current plan for a representative teacher. It finishes with a discussion about policy options and offers concluding remarks.

HOW DEFINED BENEFIT PLANS WORK

Established in 1941, the Teachers' Retirement System (TRS) has provided retirement benefits for teachers and other school employees. For most of its history, TRS has offered a final-salary defined benefit (DB) plan. This type of plan is discussed in detail in the next section. In 1991, the plan changed to a defined contribution (DC) plan. Teachers hired between July 1, 1991 and June 30, 2005 enrolled in the DC plan, which is a retirement savings plan which allows employers and employees to contribute to a retirement account on a tax-deferred basis until the account's funds are withdrawn. Under this plan, employers contribute 7.5 percent of a member's compensation, and employees contribute 4.5 percent. Funds in the account accrue interest, and the balance at retirement provides funds for retirees to draw from over their retired life. The plan closed in 2005 to new hires and reverted to a final-salary defined benefit plan.

The key feature of DC plans is that benefits are directly tied to contributions. Thus, the costs for these plans are easily known. As shown below, this feature contrasts with DB plans, where benefits are defined by a formula rather than contributions.

Final-Salary Defined Benefit Plan Structure

All public school teachers in West Virginia hired after June 30, 2005 enroll in the West Virginia Teachers' Retirement System (WVTRS). This plan is a final-salary defined benefit (DB) plan, also known as a "traditional" defined benefit plan. Under such plans, one's pension benefit is defined by the following formula:

$$Annuity_t = m * YOS * FAS * (1 + COLA_t)$$

where Annuity is the annual benefit amount received in year t , m is an accrual factor (or percentage), YOS stands for years of service credited to one's pension benefit, FAS denotes "final average salary," and $COLA$ is the cost-of-living adjustment applied to benefits in year t . Final average salary is typically the average of three to five years of one's highest annual earnings. The term $(m * YOS)$, known as the replacement rate, depicts the percentage of a worker's earnings replaced by retirement income. The annuity is the pension benefit paid each year over the worker's entire life starting from the retirement date.

Here's an example of how this plan works. Consider a teacher who works for 30 years, her final average salary is \$50,000 (the average of the last five years of her wages), and the accrual factor under the plan is

2 percent.¹ Her annuity would equal 60 percent of her final average salary or \$30,000. Typically, pension payments are distributed on a monthly basis. In this example, the retired teacher's monthly pension check would be \$2,500 for the first year plus a cost-of-living adjustment for the remainder of her life.

How Pension Benefits are Funded

Unlike defined contribution plans, benefits under defined benefit plans are not directly tied to contributions and, therefore, must be pre-funded in order to provide retirement benefits for members. Under DB plans, both workers and employers make periodic contributions to the plan over time.

$$\textit{Required contributions} = \textit{employee contributions} + \textit{employer contributions}$$

These funds are then invested and accrue interest. By the time a worker retires, total funds (contributions plus investment earnings) should be sufficient to cover the costs of the stream of payments for a retiree's post-employment life. The amount of contributions plus expected investment earnings necessary to pay for future benefits accrued by today's workers is known as normal cost.

Contributions are determined by independent actuaries, usually on an annual or biannual basis. The total contribution rate comprises two components: normal costs and payments for amortizing unfunded liabilities.

$$\textit{Total Required Contribution Rate} = \textit{Normal cost rate} + \textit{rate to amortize unfunded liabilities}$$

Employee contributions of WV TRS members are relatively stable, and the employer contribution is set at the difference between the overall required contribution rate and member rate. If contributions and investment earnings are not enough to pay for future benefits then a shortfall occurs, and the deficit between assets on hand and promised benefits will need to be made up somehow. This deficit, also referred to as unfunded actuarial liabilities (UAL) or pension debt, will increase future costs.

The next section examines funding status and trends for TRS.

1 Based on the 2019 actuarial valuation, average pay for active teachers in WV TRS with 30-34 years of service and age 55 to 59 is about \$67,000.
Buck Global, LLC. "West Virginia Teachers' Retirement System Actuarial Valuation as of July 1, 2019."

FUNDING TRENDS FOR TRS

Pension debt can be reduced in at least five ways: finding new revenue streams and making special appropriations, increasing employee and employer contributions (typically only employer), reducing benefits for workers (this action usually applies to future hires only), changing investment strategies (pension funds taking on greater financial risk), and issuing pension obligation bonds.

As far back as the 1980s, TRS faced significant funding challenges and enormous unfunded liabilities. The state has taken various actions to deal with these funding issues. Closing its DB plan and opening a DC plan in 1991 helped stop pension debt from accruing by virtue of moving to a system where benefits are tied directly to contributions.

In 2005, an effort to raise up to \$5.5 billion by issuing bonds, which would have devoted bond proceeds to the state's pension plans, was rejected by West Virginia voters.² There are long-term risks, however, associated with issuing pension obligation bonds (POBs).³

In the same year, the state also closed the DC plan for teachers and re-opened the DB plan. Around this time, the state sold its rights to payments from a tobacco settlement and directed this new funding to pay down TRS's unfunded liabilities. It's important to note that there is no causal link between improvement in the system's funding and the change from DC to DB retirement plan for teachers.

Finally, in 2015, the state reduced benefits for new TRS members hired on or after July 1, 2015. Although funding has improved over the last several decades, significant funding gaps remain.

As of June 30, 1987, the West Virginia Teachers' Retirement System had just 16 cents on hand for each dollar of pension benefits that teachers accrued. The system's unfunded actuarial accrued liabilities (UAAL), which represents the difference between assets and the value of accrued benefits, was \$2.1 billion (\$6,100 per public school K-12 student).

2 Ronald K. Snell (2005). Pensions and Retirement Plan Enactments in 2005 State Legislatures, National Conference of State Legislatures, retrieved from: https://www.ncsl.org/documents/fiscal/2005_pension_summary.pdf

3 Borrowers, such as public retirement systems, issue bonds because officials believe that the proceeds from POBs can be invested and earn a return that exceeds the interest cost of the bonds. If it plays out as officials hope, then the proceeds can be used to help shore up pension debt. If it doesn't, as would be likely in the event of an economic downturn, then the system would find itself in a deeper hole. Unfunded liabilities would increase, and managing this debt would become increasingly difficult.

By FY 1991, the funded ratio declined to 11 cents for each dollar of pension benefits. The UAAL increased to \$2.8 billion (\$8,600 per public school K-12 student). On July 1, 1991, the system closed its defined benefit plan to new hires and began operating a new plan, the Teachers' Defined Contribution Plan (TDC).⁴ Thus, TRS's funding status was in decline before it opened the TDC. But because TRS moved from a "pay-as-you-go" funding model to a system of pre-funding and a plan that tied benefits directly to contributions, funding slowly improved.

By FY 2000, the system's funding status did not experience much meaningful improvement. While the plan's funded ratio improved slightly to 21 percent, its pension debt increased to \$3.8 billion and exceeded \$13,000 per student. In contrast, the funded ratio for the median state sponsored teacher covered pension plan in the U.S. was 96.4 percent in 2001.

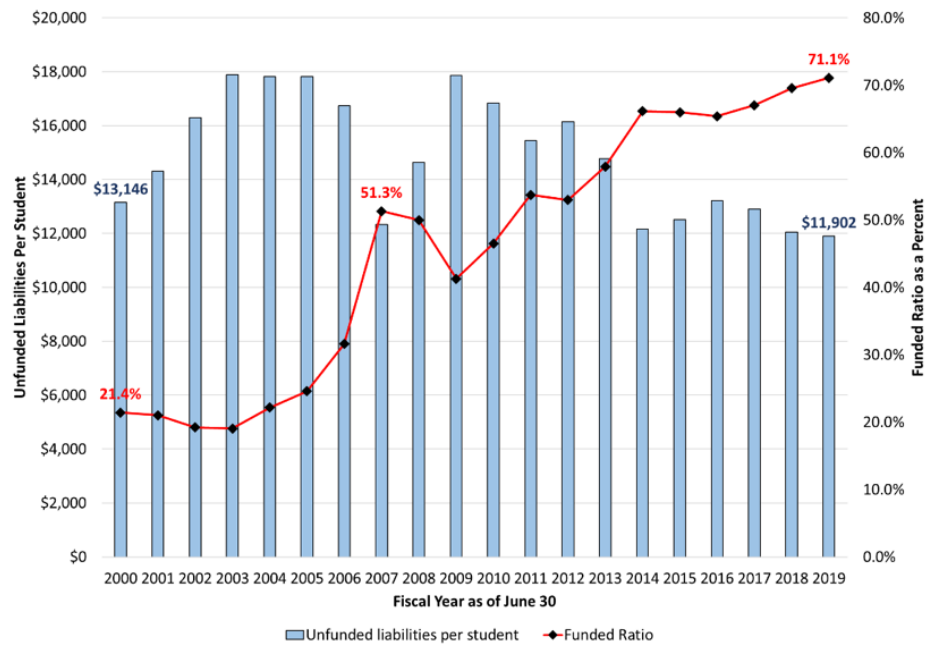
From FY 2005 to FY 2007, the system's unfunded liabilities dropped by \$1.5 billion, from \$5.0 billion to \$3.5 billion (Figure 1). This reduction in pension debt should not be attributed to closure of the TDC and opening of the DB plan. Rather, during this time, the state sold its rights to payments from a tobacco settlement and directed \$800 million of the \$911 million sale to pay down TRS's unfunded liabilities.⁵ Additional contributions to TRS were made from special appropriations, \$290 million in FY 2006 and \$313.8 million in FY 2007. These additional efforts increased the funded ratio from 24.6 percent to 51.3 percent.

4 In 1990, WV teachers went on strike over wages. Disputes over pay, coupled with the plan's severe funding challenges, were significant motivators for changing the plan.

Max Marchitello (2019). *Teacher Pension Reform: Lessons and Warnings From West Virginia*, Bellwether Education Partners, retrieved from: <https://bellwethereducation.org/publication/teacher-pension-reform-lessons-and-warnings-west-virginia>

5 Phil Kabler (2018). "WV's tobacco settlement payment slips as drop in smoking accelerates," *Charleston Gazette-Mail*, June 11, retrieved from: https://www.wvgazette.com/news/health/wvs-tobacco-settlement-payment-slips-as-drop-in-smoking-accelerates/article_08252470-d3a8-54a6-bd35-63c24e6a4a70.html

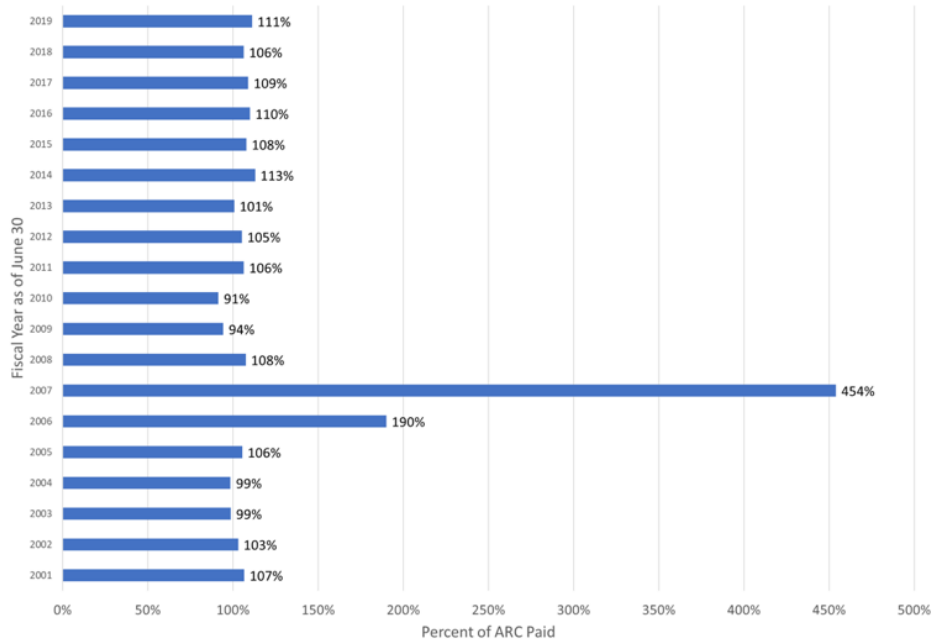
Figure 1: West Virginia Teachers' Retirement System Funded Ratio and Unfunded Actuarial Liabilities Per Student Adjusted for Inflation, FY 2000-2019



Sources: Author's calculations based on data from WVTRS actuarial valuation reports, U.S. Bureau of Labor Statistics, and the National Center for Education Statistics, U.S. Department of Education

The funded ratio increased to 71.1 percent in 2019, and total unfunded liabilities decreased to \$3.2 billion. Between 2001 and 2019, the amount of contributions as a percentage of the annual required amount (the amount calculated annually that is necessary to pay down unfunded liabilities) exceeded 100 percent almost every year (Figure 2). \$1.7 billion total additional contributions from Special Appropriations and the Tobacco Securitization were made between FY 2006 and FY 2019.

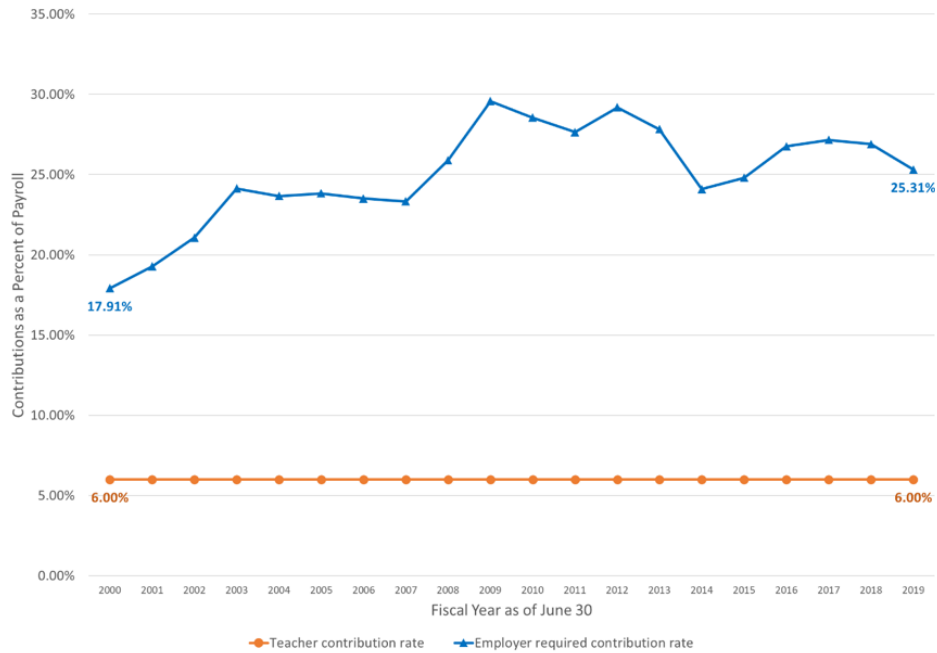
Figure 2. Percentage of Annual Required Contributions Paid for West Virginia TRS, FY 2001 to FY 2019



Source: Public Plans Data. Center for Retirement Research at Boston College, Center for State and Local Government Excellence, and National Association of State Retirement Administrators

Despite the state’s efforts to shore up the TRS’s unfunded liabilities, employer costs have risen. Figure 3 displays the employee and employer required contribution rates between FY 2000 and FY 2019. Teachers contribute 6 percent of their pay each year to TRS for pension benefits. Employer contributions are calculated yearly and depend on numerous factors. The employer’s cost of the plan as a percentage of payroll was 17.9 percent in FY 2000 and increased to 25.3 percent in FY 2019.

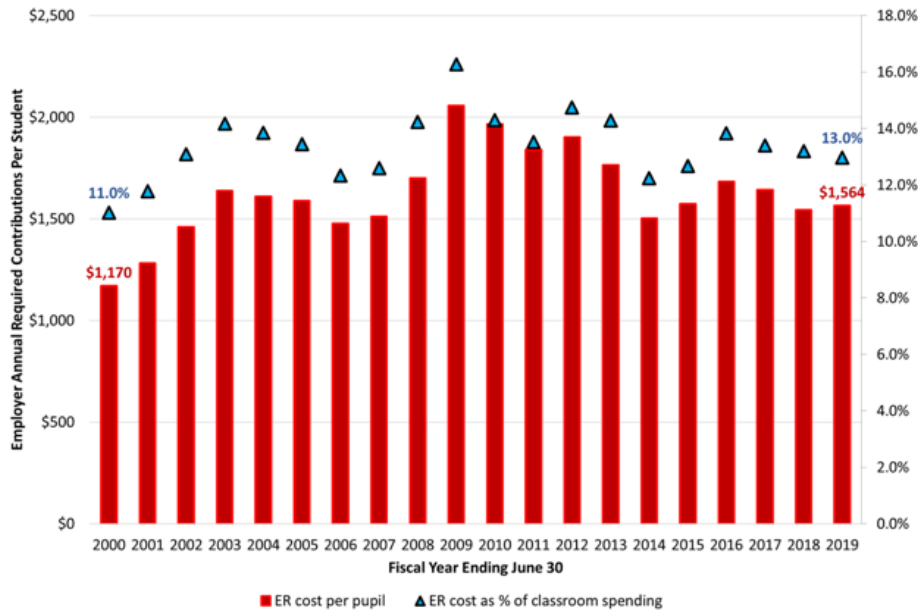
Figure 3. Employee and Employer Required Contribution Rates, WV TRS, FY 2000 to FY 2019



Employer pension costs in terms of dollars per student have also increased during this period and comprise an increasing share of resources directed at public school classrooms. Figure 4 plots the state’s required contributions on a per-student basis (bars) and the share of these costs as a percentage of classroom spending (triangles) from fiscal years 2000 to 2019.⁶ In FY 2000, employer costs in real dollars were \$1,170 per pupil. This cost represented 11 percent of current expenditures per pupil for West Virginia public schools. This cost increased by 34 percent in FY 2019 to \$1,564 per student or 13 percent of resources directed towards public school classrooms.

6 The jump in the required contribution rate in 2008 and 2009 was in part due to investment losses from the Great Recession.

Figure 4. Employer Annual Required Contributions (ARC) Per Student and Actual Employer Contributions Per Student, FY 2000 to FY 2019 (\$ adjusted for inflation)



Sources: Author's calculations based on data from West Virginia TRS; National Center for Education Statistics, U.S. Department of Education; U.S. Census Bureau; and U.S. Bureau of Labor Statistics

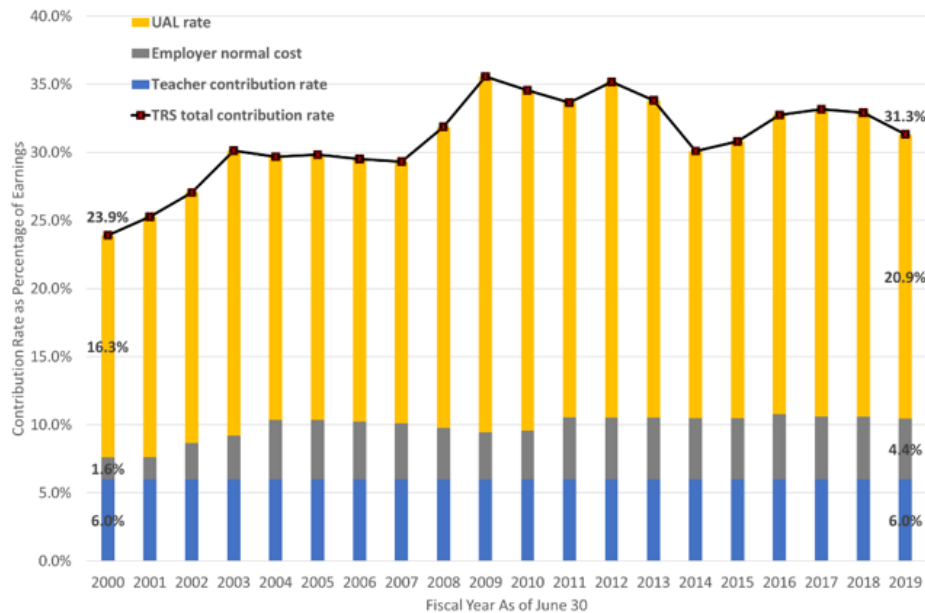
Notes: After FY 2012, the Government Accounting Standards Board (GASB) no longer required state-sponsored retirement systems to report ARC. Dollars are adjusted for inflation and reported in 2019 USD.

Between fiscal years 2000 and 2019, the total cost of the plan increased from 23.9 percent of payroll to 31.3 percent. Figure 5 displays the breakdown of the plan's total costs (expressed as percent of earnings, black line) for the unfunded actuarial liabilities (yellow bars), employer normal cost (gray bars) and teacher contributions (blue bars) components.

In 2000, the total cost of pre-funding the plan was 23.9 percent. This was funded by teacher contributions (6 percent of payroll) and employer contributions (17.9 percent). Of the employer's cost, 1.6 percent of earnings covered the employer's normal cost, and 16.3 percent covered unfunded liabilities.

All of a teachers' contributions are applied to normal costs, and the state's portion of normal costs is the difference between total normal costs and teacher contributions. The state also covers the unfunded liabilities share of costs. Total normal costs (teacher contributions plus employer normal cost contributions) increased over the period from 7.6 percent in 2000 to 10.4 percent in 2019. Teacher contribution rates remained constant throughout the period at 6.0 percent of earnings.

Figure 5. Pension Contribution Rates for WV TRS: Total, UAL, Employer Normal Cost, and Teachers, FY 2000 to FY 2019

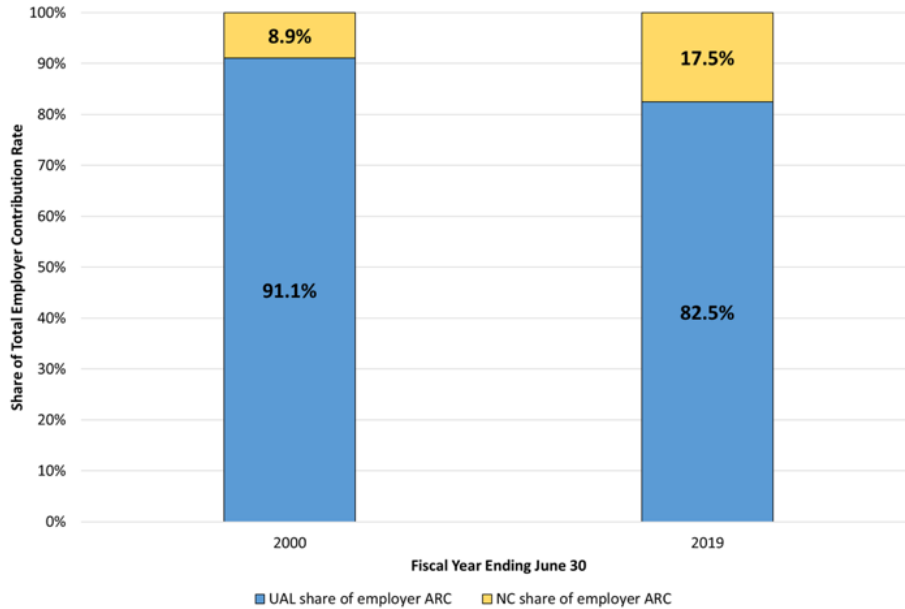


Sources: West Virginia Teachers' Retirement System actuarial valuation reports

The increase in employer costs between 2000 and 2019 is driven by increases in both the normal cost and unfunded actuarial liabilities components. The share of employer costs directed towards paying for unfunded liabilities is striking. Figure 6 shows that in FY 2000, 91 percent of employer costs paid down unfunded liabilities. Just 9 cents of every dollar were directed toward pre-funding future benefits accrued by employees for their work during that fiscal year.

By 2019, these shares converged slightly where 82.5 percent of employer contributions went towards paying down unfunded liabilities while just 17.5 percent of contributions were for normal costs. West Virginia, however, continues to pay for a funding situation created decades ago. While the system's funding situation seems to have improved, at least by some measures, over the last several decades, improvement has been very slow. Conditions with defined benefit plans allow costs to easily be deferred for decades and, consequently, places responsibility for filling in funding gaps on the shoulders of future generations of taxpayers.

Figure 6: West Virginia Teachers' Retirement System Share of Employer Required Contributions for Unfunded Liabilities and Normal Cost, FY 2000 to FY 2019



Sources: Author's calculations based on West Virginia Teachers' Retirement System actuarial valuation reports

Although it may seem that West Virginia's plan for teachers is on a path forward to solving its fiscal problem from decades ago, there is an important lesson. West Virginia's defined benefit plan has pushed costs onto future taxpayers and students, and despite efforts to fill funding holes, considerable gaps remain. Moreover, without a direct link between benefits and contributions, financial risk remains for today's taxpayers (and students in classrooms) as they shoulder the cost. The plan decades ago created substantial loss of opportunity for teachers and children in the classroom today and in the future.

Unfunded liabilities represent resources that could be directed to other areas of education that more directly benefit students. For instance, these resources could have been directed toward increasing teacher take-

home pay, which could facilitate recruiting and retaining quality teachers, or these resources could have also been used for student-centered activities.⁷

The discussion so far has focused on major funding issues facing TRS. To be sure, an important goal of public schools is to recruit and retain a high-quality workforce. Some argue that defined benefit plans are effective instruments for achieving this goal. But are these plans effective at accomplishing the goals of teacher recruitment and retention? The history of defined benefit plans spans more than a century while West Virginia's TRS is 80 years old.⁸ Although evolution of this plan is beyond the scope of this paper, it is important for teachers and policymakers to understand how benefits accrue under these plans. Do these plans make sense for today's workforce? What are the incentives underlying these plans? What implications do they have for teachers? Who are the "winners and losers" under these plans? The next section examines these questions.

HOW BENEFITS ACCRUE UNDER WV TRS

Measuring Pension Wealth

Depicting the value of one's pension under a final-salary defined benefit plan is complicated for several reasons. First, the value of one's lifetime pension can vary significantly depending on when a worker separates from service. If a worker separates from service before reaching retirement eligibility, she may

7 Field trips provide one example. Rigorous research finds that activities such as visiting museums and live theater performances improve social and cognitive effects and civic values of students. For examples, please see: Jay P. Greene, Heidi H. Erickson, Angela R. Watson, and Molly I. Beck, "The play's the thing: Experimentally examining the social and cognitive effects of school field trips to live theater performances." *Educational Researcher* 47(4), pp. 246-254, (2018), <https://journals.sagepub.com/doi/abs/10.3102/0013189X18761034>.

Daniel Bowen and Kisida, Brian, *Assessing the Impact of the Holocaust Museum Houston's Field Trips on Adolescents' Civic Values*, (2017), <http://dx.doi.org/10.2139/ssrn.3000551>.

Jay P. Greene, Heidi Holmes Erickson, Angela Watson, and Molly I. Beck, *The Play's the Thing: Experimentally Examining the Social and Cognitive Effects of School Field Trips to Live Theater Performances*, EDRE Working Paper No. 2017-13, (2017), <http://dx.doi.org/10.2139/ssrn.3030928>.

Jay P. Greene, Brian Kisida, and Daniel H. Bowen, "The educational value of field trips: Taking students to an art museum improves critical thinking skills, and more," *Education Next* 14 (1), pp. 78-87, (2014), https://www.educationnext.org/files/ednext_XIV_1_greene.pdf.

8 Georgetown University Law Center, *A Timeline of the Evolution of Retirement in the United States*, (2010), <https://scholarship.law.georgetown.edu/cgi/viewcontent.cgi?article=1049&context=legal>.

leave her contributions with the pension fund and defer her benefit. This means she may start collecting pension payments once she reaches retirement eligibility. The potential effects of inflation can complicate how one values this benefit and must be accounted for.

Second, benefits under defined benefit plans are a function of tenure, age, and salary. Thus, accrual patterns can be highly nonlinear and differ dramatically for different entry and separation points. The unsmooth, nonlinear patterns can have important implications for incentives that teachers face when it comes to timing their retirement. Sometimes these incentives may conflict with circumstances in the worker's life, which may also influence retirement decisions.

Third, workers receive a stream of benefit payments for the rest of their lives. The number of years of payments that workers receive can vary from worker to worker and is unknown. Thus, the period that workers collect a pension (and the overall value of that pension) will vary.

Fourth, how an individual values a given amount of money over time varies. One dollar today is not the same as one dollar 10 years in the future. This can complicate comparisons of benefits at different points in time.

Pension wealth, popularized by Robert Costrell and Michael Podgursky from their seminal work on teacher pensions, is one measure that attempts to account for these different layers of complexity.⁹ It is the expected present value of the stream of pension payments for a worker, conditional on entry and separation age, and discounted for survival probabilities. Pension wealth is expressed as a lump sum. This can be understood as the value of a pot of money that a teacher will receive during retired life.

The extent that future benefits are discounted is important. A higher discount rate implies less pension wealth because pension wealth equals promised future benefits discounted to their "present value." Present value conveys that \$100 today is worth less than \$100 in the future, and the number of dollars required to generate \$100 in the future depends on the discount rate. The higher the discount rate, the fewer dollars required to generate some given future amount and vice versa.

Pension wealth (PW) is defined by the following formula:

$$PW(S) = \sum_{A \geq S} \frac{Ann(A|S) * Surv(A|S)}{(1 + r)^{(A-S)}}$$

where Ann is the value of the annuity, collectible at age A and conditional on separation from covered service at age S . In words, pension wealth is the present value of the stream of pension payments conditional on separation, weighted by conditional survival probabilities, $Surv(A|S)$, and discounted back to the present at rate r .

9 Robert M. Costrell and Michael Podgursky, "Peaks, cliffs, and valleys: The peculiar incentives in teacher retirement systems and their consequences for school staffing," *Education Finance and Policy*, 4(2), pp. 175-211, (2009), <https://doi.org/10.1162/edfp.2009.4.2.175>.

Pension wealth calculations are made for a representative female teacher who begins teaching at age 25.¹⁰ The analysis uses teacher salary schedules for the Hartford public school district and draws survival probabilities from the Center for Disease Control's *Life Tables*.¹¹ Because we are applying survival rates, we are calculating expected pension wealth (referred to simply as pension wealth throughout this paper).

Estimates are generated assuming a 7.5 percent nominal interest rate (including 2.5 percent inflation). There is no cost-of-living allowance. Final average salary of the WVTRS plan is based on the five highest fiscal year salaries out of the last 15 fiscal years. The analysis does not assume any survivor or disability benefits.

Tier 2 Pension Plan for Teachers

The WV TRS was established in 1941 to provide retirement benefits under a defined benefit plan for teachers and other school personnel. In 1991, the state closed its DB plan and established a defined contribution plan for teachers known as the Teachers' Defined Contribution plan (TDC). The state then closed the TDC to new hires in 2005 and re-opened its defined benefit plan. The TDC and DB plans were merged, and teachers enrolled under the TDC could elect to transfer to the DB plan. WV TRS currently operates two DB plans known as Tier 1 and Tier 2.

Eligibility for these plans depend on a teacher's date of hire. Teachers hired between 1991 and 2006 enrolled in the TDC plan. Once the TDC plan closed to new hires in 2006, teachers hired after this time enrolled in a DB plan. Teachers hired before July 1, 2015 are enrolled under the Tier 1 plan. Teachers who were enrolled in the TDC and elected to transfer into the DB plan would also be enrolled under Tier 1. All teachers hired on or after July 1, 2015 are enrolled under Tier 2.

Under the DB plans, teachers may retire upon reaching various retirement eligibility criteria. Retirement eligibility depends on both age and the number of years of service. Eligibility requirements for retirement and how benefits accrue under the two DB plans differ considerably.

The pension accrual analysis focuses on Tier 2 and discusses implications for the state's teacher labor market.

Table 1 compares the main components of the plans (normal retirement, early retirement, deferred retirement, and refund benefits). Pension plans for West Virginia teachers also provides benefit options such

10 I assume our teacher works full time and has a bachelor's degree her first five years and a master's degree after five years. I also assume no adjustments for longevity or other add-ons that may be used to calculate final average salary for pension benefits.

11 Elizabeth Arias, Jiaquan Xu, and Kenneth D. Kochanek, *United States Life Tables*, 2016, National Vital Statistics Reports, Vol. 68, No. 4, (2019), https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_04-508.pdf
Collective Bargaining Agreement Between the Hartford Board of Education and the Hartford Federation of Teachers Local No. 1018, AFT, AFL-CIO, July 1, 2014-June 30, 2017, http://teachercontracts.conncan.org/sites/default/files/pdf/tcd_hartford.pdf.

as survivorship benefits and disability benefits. The present analysis focuses only on pensions and does not consider post-employment retirement benefits (retiree healthcare benefits).

Tier 2 teachers become **vested** in WV TRS with 10 years of service. Upon vesting, teachers may separate from the system at any time and start collecting pension benefits upon reaching retirement eligibility. Pension benefits are based on an accrual factor (2 percent), years of service (YOS), and the average of one's final five years of salary (FAS). There is no cost-of-living adjustment.

A Tier 2 teacher who is working in covered employment at the time of retirement may qualify for **normal retirement** and can start collecting full (unreduced) pension benefits at age 62 with 10 years of service, if they are working in covered employment at the time of retirement.¹² A teacher retiring with a normal benefit will receive 2 percent of final average salary for each year of service.

Teachers may also qualify for **early retirement** and collect a reduced benefit. Early retiree's pension benefits would be actuarially reduced. The size of the discount depends on one's age at separation.¹³ A Tier 2 teacher may not retire and start collecting benefits before age 55. Rather, Tier 2 teachers may start collecting reduced benefits starting at age 55 with 30 years of service, starting at age 57 with 20 years of service, or starting at age 60 with 10 years of service.

12 A Tier 1 teacher may retire at any age after attaining at least 35 years of service. For example, a teacher who starts teaching at age 22 and accrues 35 years of service may retire and collect a full benefit at age 57. A teacher who entered service at age 25 would earn 30 years of service with uninterrupted service by age 55. She would be eligible to retire and collect unreduced benefits immediately.

A Tier 2 teacher, on the other hand, must have at least 10 years of service and would not start collecting unreduced benefits until she reaches age 62. Unlike Tier 1 teachers, a Tier 2 teacher would not be able to retire with full benefits before age 62.

13 Early retirement factors are currently available for Tier 1 only. As of right now, Tier 2 members are not eligible for retirement as the vesting requirement is 10 years of service, and Tier 2's inception was 6 years ago. Early retirement factors for Tier 2 members will become available after 2025. The present analysis employs early retirement factors for Tier 1, which were obtained from the West Virginia Consolidated Public Retirement Board.

Table 1: West Virginia Teachers Retirement System - Provisions for Tier 1 and Tier 2 Plans

	Tier 1	Tier 2
Plan Eligibility	TRS members hired before July 1, 2015	TRS members hired on or after July 1, 2015
Vesting	5 YOS	10 YOS
Normal retirement eligibility (full benefits)*	age 60/5+ YOS; age 55/30+ YOS; any age/35+ YOS	age 62/10+ YOS
Early retirement eligibility (reduced benefits)*	before age 55/30+ YOS	age 55/30+ YOS; age 57/20+ YOS; age 60/10+ YOS
Deferred retirement eligibility	age 62/5+ YOS; age 60/20+ YOS	age 64/10+YOS; age 63/20+ YOS
Withdrawal**	own contributions only, with 4 percent interest for 5 years following the year when last contribution was made	own contributions only, with 4 percent interest for 5 years following the year when last contribution was made
Cost-of-living adjustments*	none	none
Teacher contribution rate	6 percent of salary	6 percent of salary
Employer contribution rate	determined annually	determined annually
Benefit	2 percent x FAS x YOS	2 percent x FAS x YOS
Final average salary	average of 5 highest fiscal year salaries out of last 15 fiscal years	average of 5 highest fiscal year salaries out of last 15 fiscal years

Source: West Virginia Consolidated Retirement Board

Note: YOS denotes years of creditable service

* Applies to members working in covered employment at time of retirement; members who separate before reaching retirement eligibility qualify for a deferred benefit.

** Interest for early withdrawal accrues at a 4 percent rate for five years following the year in which the last contribution was made while funds remain in the pension fund.

Vested teachers who leave the system before reaching retirement eligibility face two choices. The teachers may receive a **deferred retirement** by leaving their contributions with TRS and begin collecting a pension upon reaching retirement age. For example, a Tier 2 teacher who begins teaching in West Virginia at age 25 and separates from TRS at age 45 (after 20 years) would be eligible to collect unreduced pension payments upon turning age 63. The same teacher under the Tier 1 plan would accrue a few years' worth of extra full benefits – starting at age 60. With 10 years of service, a Tier 2 teacher can collect deferred benefits starting at age 64 while a Tier 1 teacher can collect benefits starting at age 62.

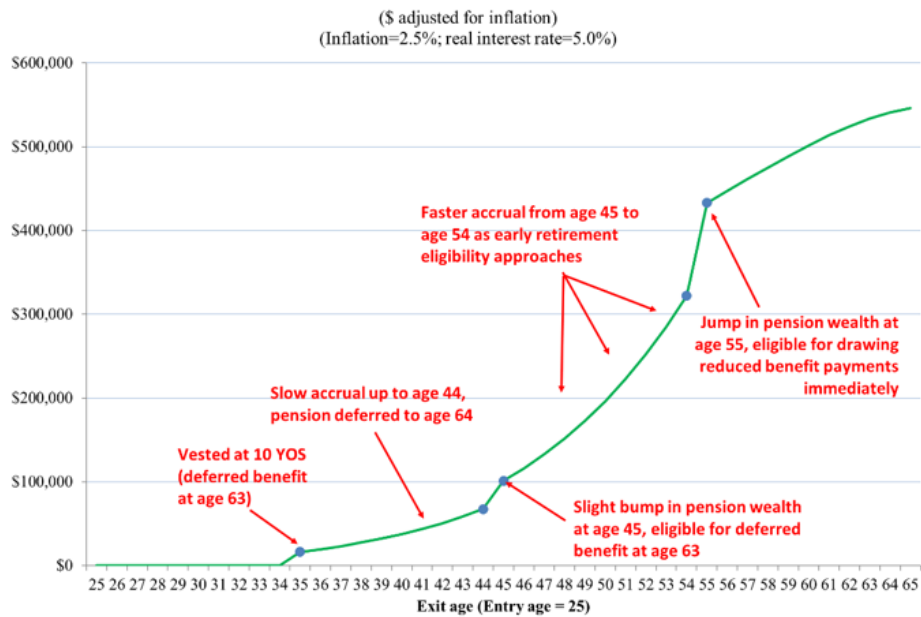
Teachers who leave any time before reaching retirement eligibility may also elect to receive a **refund** of their contributions with interest instead of a pension.¹⁴ As with most public defined benefit plans for teachers in other states, teachers who elect for a refund do not receive the employer portion of contributions.

Retirement benefits under this plan accrue in a complex and highly nonlinear manner. This is the topic of the next section.

Pension Wealth Accrual for a Teacher In Kanawha County Schools

Figure 7 depicts how pension wealth accrues under Tier 2 for a teacher who enters the retirement system at age 25. The picture shows the backloaded nature of this plan, which is a typical feature of defined benefit plans. That is, pension benefit accrual is slow early in one’s career and ramps up when key retirement eligibility criteria are met.¹⁵

Figure 7: Gross Pension Wealth Accrual for Female Teacher in Kanawha County Public Schools, West Virginia



Source: Author's calculations

14 Interest for early withdrawal accrues at a 4 percent rate for five years following the year in which the last contribution was made while funds remain in the pension fund.

15 After netting out the teacher’s cumulative contributions, the accrual pattern displayed in the figure will remain the same and the level of the curve will shift lower.

Under this plan, a teacher vests after reaching 10 years of service and becomes eligible to collect pension payments starting age 62.

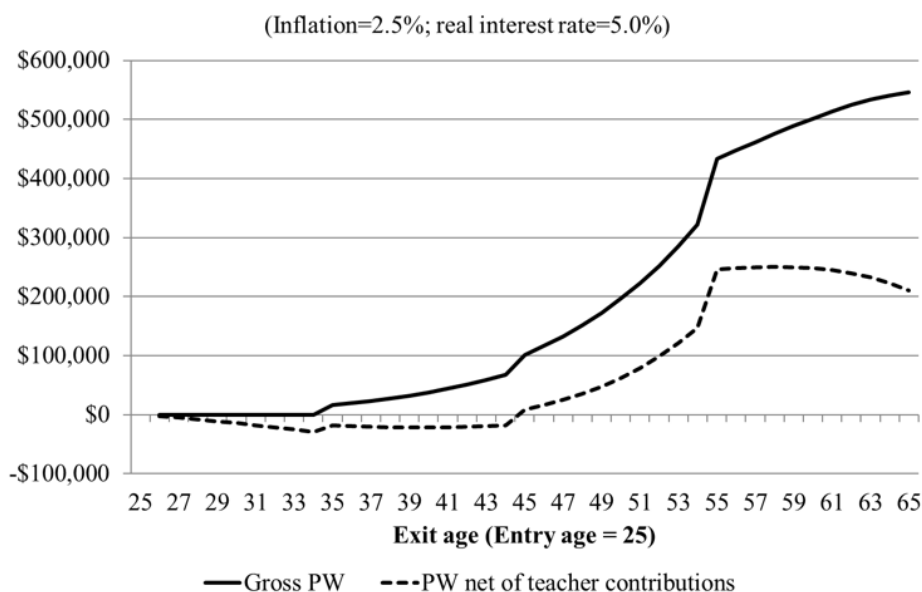
After vesting, pension wealth accrues slowly up to age 44. During this portion of her career, a vested teacher who separates and defers a pension benefit can begin drawing payments at age 64. If she separates from service right after vesting, her pension wealth, the expected present value of the stream of payments she would be able to collect starting at age 64, is about \$16,000. At age 44, her pension wealth is about \$68,000.

At age 45 with 20 years of service our teacher qualifies for a deferred pension beginning one year earlier at age 63. By working from age 44 to age 45, her pension wealth increases by about \$34,000: from \$68,000 to \$101,000. From age 45 to age 54, growth in pension wealth accrual increases rapidly before taking a large jump.

At age 54, her pension wealth is worth about \$322,000. At this point in her career she has 29 years of experience but wouldn't be able to start collecting a pension until age 63. If she waits one more year and separates from the system at age 55, however, she becomes eligible to draw pension payments immediately. This represents eight additional years of pension payments, and the value of her pension wealth jumps by almost \$113,000 to \$440,000.

Figure 8 displays pension wealth net of our teacher's own contributions. It reproduces the pension wealth curve from Figure 7 and adds a pension wealth accrual curve that nets out teacher contributions (the lower line). After subtracting the teacher's cumulative contributions, the accrual pattern displayed in the figure remains the same and simply shifts the curve down. Two striking observations emerge from the bottom curve.

Figure 8: Gross and Net Pension Wealth Accrual for Female Teacher in Kanawha County Public Schools under TRS Tier 2



Source: Author's calculations using information from the West Virginia Consolidated Public Retirement Board

First, the curve dips below zero until age 45, implying that for a given year the value of her contributions is greater than the value of her pension wealth that has accrued up to that point. No pension wealth accrues during the first nine years because Tier 2 members do not vest in the plan until their tenth year of service. Even when vested, however, net pension wealth remains negative up to age 44.

Only when she reaches her next key eligibility marker (20 years of service, eligible for deferred benefit at age 63) does her net pension wealth accrual become positive, i.e., the value of her pension wealth becomes greater than what she puts into the pension fund. This feature is indicative of traditional DB plan design – whether intentional or not, they favor certain groups of teachers (long-termers) over other groups (mobile teachers, non-lifers). Benefits accrue very slowly in the beginning of one’s career in the retirement system, eventually ramping up around mid-career.

Second, the peak of the curve occurs at around age 55 – this point represents the point in this particular teacher’s career where her pension wealth is most valuable. Staying beyond this point means that the size of her “pension pot” starts to shrink. Thus, from a financial perspective, there is a point in these plans where teachers incur an implicit “penalty” for staying in the system instead of retiring.

By design, the accrual patterns under this plan create strong “pull” and “push” incentives, albeit at arbitrary points in a teacher’s career. These incentives are evident in Figure 9, which shows the year-over-year change in net pension wealth and represents the value of a given year of work at a particular point in one’s career. Think of each point in this figure as the change in the size of one’s pension pot for that year’s work.

A strong “pull” incentive materializes as a spike in pension wealth at age 55. This is a point where a teacher reaches 30 years of service and becomes eligible for early retirement and can immediately begin drawing pension payments for actuarially reduced benefits. She can grow her pension wealth by about \$100,000, net of her contributions, by working an additional year from age 54 to 55. This point represents a strong incentive for teachers to continue teaching in the system until this point, especially teachers who are close to this point in their careers.

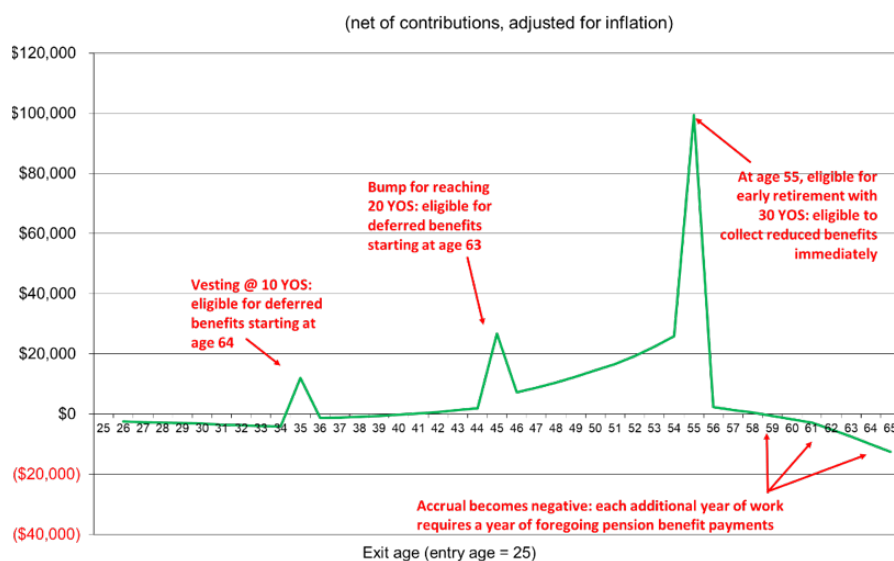
The plan also has strong “push” incentives built in. For our representative teacher, this occurs after age 57, where pension wealth accrual becomes negative. From here on, each additional year of work requires foregoing more valuable years’ worth of pension payments.

Such built-in incentives are very common features in many states’ defined benefit plans, though the timing and size of these pension spikes varies from plan to plan. Observing these patterns in West Virginia’s plan for teachers raises questions: what is the reason that warrants these incentives for having pension spikes occur at these key points in a teacher’s career? Do teachers become much more effective when they turn age 55 or once they work 30 years? Is a teacher in her 31st year of service much less effective than she was when she taught during her 30th year?

Empirical evidence suggests that, on average, seasoned teachers tend to be more effective than novice teachers, as measured by value-added. There is significant overlap, however, in the distributions of these

groups.¹⁶ This means that while there are many experienced teachers who are effective, there are also almost as many novice teachers who are similarly effective. Likewise, while there are many novice teachers who are ineffective, there are also almost as many more experienced teachers who are ineffective. This does not support the timing of the arbitrary incentives embedded in the pension plans.

Figure 9: Year-Over-Year Change in Gross Pension Wealth for Representative Teacher in West Virginia Under TRS Tier 2



Source: Author's calculations using information from the West Virginia Consolidated Public Retirement Board.

Supporters of defined benefit plans argue that they provide an effective tool for incentivizing teachers to remain in teaching for an entire career. While they are correct that these plans tend to offer higher maximum retirement benefits than alternative plans, teachers who do not remain in a system long enough to maximize these benefits may face significant penalties. In the typical teachers' plans, those who separate from the system before reaching key eligibility milestones will accumulate much less pension wealth than they would if they remain in the system long enough to reach these key points.

Costrell and Podgursky compared pension wealth accumulation between teachers who stay in a single pension system until reaching retirement eligibility and teachers who divide their career between two different systems.¹⁷ They showed that teachers who leave a pension system before reaching retirement

16 Dan Goldhaber, *Teacher Effectiveness Research and the Evolution of US Teacher Policy*, The Productivity for Results Series, No. 5., George W. Bush Institute, (January 2015), <https://files.eric.ed.gov/fulltext/ED560206.pdf>.

17 Robert M. Costrell and Michael Podgursky, "Distribution of benefits in teacher retirement systems and their implications for mobility," *Education Finance and Policy*, 5(4), pp. 519-557, (2010), https://doi.org/10.1162/EDFP_a_00015.

eligibility incur substantial losses in their pension wealth, up to half in some cases, relative to teachers who remain in one system until retirement eligibility. Lack of portability and reciprocity among pension systems amounts to a penalty on teacher mobility and partial careers.

These systems create winners and losers, as shown by Costrell and McGee. They analyzed individual-level data to study California by comparing the value of benefits with the uniform contribution rate for each teacher and documented that about two-thirds of all entering teachers received benefits worth less than their contributions.¹⁸

Another approach to examining the question of winners and losers is by using withdrawal rates based on years of service and age. Pension experts have used these data to examine retention within given pension plans.¹⁹ From these actuarial tables, we can estimate the percentage of teachers who remain in the pension system conditional on years of service and age.

Figure 10 overlays the net pension wealth accrual curve from Figure 7 with a plot of cumulative retention rates based on WV TRS assumed withdrawal and retirement rates. Based on these rates, an estimated 61 percent of WV TRS cohort members will remain in the system by four years (prior to reaching the vesting requirement of five years) while an estimated 41 percent of members will remain by age 54 (right before teachers with 30 years of service will become eligible for retirement eligibility). Retention subsequently ramps down at an increasing rate as teachers from a cohort become eligible to start collecting pension benefits.²⁰

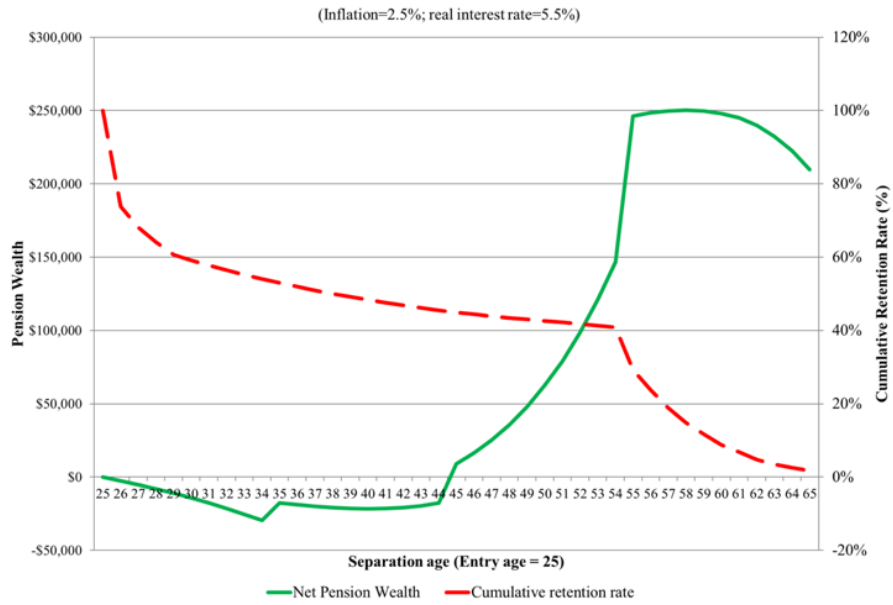
The key takeaway here is that pension wealth accrues in a way that disproportionately benefits a minority group of teachers. More than half of an entering teacher cohort will leave the retirement system when net pension wealth accrual is negative. These are teachers who leave when the value of their pension benefit is less than their cumulative contributions. Fewer than half of an entering teacher cohort will remain long enough to reach the area where pension wealth plateaus.

18 Robert M. Costrell and Josh McGee, “Cross-Subsidization of Teacher Pension Costs: The Case of California,” *Education Finance and Policy*, 14(2), pp. 327-354, (2019), https://doi.org/10.1162/edfp_a_00253.

19 Joshua B. McGee and Marcus A. Winters, “How pensions contribute to the premium paid to experienced public school teachers,” *Educational Researcher*, 46(5), pp. 250-258, (2017), <https://doi.org/10.3102/0013189X17721906>.
Chad Aldeman and Andrew J. Rotherham, “Friends without benefits: How states systematically shortchange teachers’ retirement and threaten their retirement security,” Bellwether Education Partners, (2014), https://www.teacherpensions.org/sites/default/files/Bellwether_PensionPaper_070814_Web.pdf.

20 These rates are weighted by gender based on teacher data from NCES. Of public school teachers in West Virginia, 76 percent are female and 24 percent are male. U.S. Department of Education, National Center for Education Statistics, National Teacher and Principal Survey (NTPS), “Public School Teacher Data File,” 2017–18, https://nces.ed.gov/surveys/ntps/tables/ntps1718_ftable02_t1s.asp.

Figure 10: Gross Pension Wealth and Cumulative Retention Rates for Female Teacher in Kanawha County, WV Public School District



Source: Author's calculations based on withdrawal rates for female members that are reported in the WV TRS FY 2019 actuarial valuation report

CONCLUSION

Key features of defined benefit (DB) plans can create inequities among teachers and severe funding challenges. The primary culprit is that benefits under these plans are not directly linked to contributions and leave plans susceptible to severe underfunding. Three decades ago, West Virginia's plan had just 11 cents on hand to pay for its obligations. The state took various measures to shore TRS's unfunded liabilities and managed to close the funding gap from 11 percent funded to 71 percent funded. However, taxpayers and students who weren't around at that time have shouldered the rising pension costs.

Moreover, rising costs represent a significant cost in lost opportunities for current teachers. The state could have used resources devoted to paying down pension debt for purposes such as raising take-home pay for today's teachers. In the absence of rising costs due to unfunded liabilities, the state also could have deployed these resources in other areas, such as funding other educational areas, providing other public services, or lowering taxes.

DB plans often lack portability, which is the case with West Virginia's plan. Although portability is a matter of plan design and can be achieved with any type of plan, most DB plans for public workers lack portability that many DC plans provide.

Suggestions For Pension Reform

1. **Directly link benefit costs with contributions.**

Because benefits under DB plans are determined by formulas independent of contributions and therefore must be pre-funded, many proponents for pension reform argue for defined contribution (DC) plans to mitigate risk of underfunding. A DC plan is an account-based plan, such as a 401(k) plan, where the employer and employee make contributions that are deposited in a retirement account, and these funds are then invested and accrue interest. Costs for DC plans are predictable whereas required contribution rates for DB plans often vary year to year due to accrual of unfunded liabilities and deviations of plan experience from actuarial assumptions.

2. **Increase pension portability for all teachers.**

The state should have a plan where teachers who separate from service at any time, regardless of the reason or their own life circumstances, are not penalized for mobility. Any type of retirement plan can be designed well or designed poorly. West Virginia has offered teachers both DB and DC plans, and each plan lacks portability for teachers who might leave the system before reaching retirement eligibility. Under the old DC plan, teachers could not fully vest in their employer contributions until they worked in the system for at least 12 years. The state increased the vesting

requirement for the Tier 2 DB plan from 5 years to 10 years. Just 50-60 percent of teachers in the system stick around long enough to vest under these plans.

To make these plans more portable, the state should consider lowering vesting requirements. It should also consider providing access to employer contributions for teachers who don't stay for full careers.

Moreover, the pandemic spurred increased interest in alternative educational options. With the introduction of new educational innovations, such as learning pods, and growth in student enrollment in non-traditional public sectors, such as private schools and homeschooling, new opportunities for teachers are emerging in nonpublic settings. Increased portability will make these transitions smoother and reduce fiscal penalties that cross-sector movers may face.

3. Pension benefits should accrue in a smooth manner, and retirement eligibility should not be based on arbitrary ages or tenure.

Pension plans that base retirement eligibility on age and years of service generate exceedingly strong incentives for teachers to stay or leave at arbitrary points in their career. We see such incentives embedded in TRS's plans. A plan designed so that benefits accrue in a smooth manner would be more fair for all teachers and remove fiscal penalties that the current plan imposes on mobile teachers.

4. Insulate pension plans from strong political incentives to push costs onto future generations of taxpayers, teachers, and students.

Politicians face strong incentives to push funding responsibilities onto future generations which also increases the risk for financial crises to materialize. Moreover, DB plans lack transparency and mask the true costs of these plans, which only serves to push costs onto future taxpayers.²¹ Shifting to a plan that directly ties contributions to benefit costs would help mitigate these problems.

21 Joshua D. Rauh (2019). *Hidden Debt, Hidden Deficits: The 2019 Update*, Hoover Institution, Stanford University, retrieved from: <https://www.hoover.org/news/hidden-debt-hidden-deficits-2019-update>



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