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Understated Costs

Teacher Pensions in Connecticut



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Executive Summary

By its own measures, the Connecticut State Teachers' Retirement System has unfunded liabilities of almost \$17 billion; the system has 52 cents for every dollar needed to pay for benefits accrued by its members as of June 30, 2018. The gap between what the system owes for accrued benefits and the assets it has on hand to pay for obligations represents more than \$31,000 for each public school student in the state.

Given how the plan values pension benefits, unfunded liabilities are likely understated and do not accurately reflect the true investment risk and cost. This paper estimates CTRS unfunded liabilities for a range of discount rates. Because public employees in Connecticut have very strong protections in place for their pension benefits, the value of benefits are significantly higher than stated (by up to twice the value reported under the assumed discount rate). Unfunded liabilities may be more than three times what is stated, up to \$50 billion.

To be clear, these estimates under lower discount rates are not based on investment expectations and asset management. Rather, they reflect the risk of the plan and the reality that pension promises have strong protections. The argument for using a lower discount rate to value liabilities is independent from any assertions made about expectations for investment returns. It is important for policymakers and stakeholders to realize that any discussion about expected investment returns is separate and distinct.

Below are some guidelines for policymakers and pension plan trustees to increase transparency and intergenerational equity:

• Report unfunded liabilities under a wider range of discount rates.

Under current Governmental Accounting Standards Board reporting requirements, CTRS reports its net pension liability using its current discount rate, plus the liability using discount rates that are 1 percentage point higher and lower than the current rate. In addition, the Second Exposure Draft of the Proposed Revision of Actuarial Standard of Practice (ASOP) No. 4 includes recommendations for pension plans to disclose a low-default-risk obligation measure of benefits. Pension plans in Connecticut like CTRS should, at minimum, report their liabilities under a broader range of discount rates, including a risk-free rate, and disclose the protections and guarantees that public workers have for pension benefits. Public pension plans do not have to confine public reporting to GASB requirements.

• Unlink assumptions for the discount rate and investment expectations.

Most or all defined benefit plans base the discount rate on the assumed rate of return for investments, even though they are not obligated to do so. Every state and even different pension plans face different circumstances that can affect funding differently. In some cases, a 7% or 8% assumption for investment returns may be appropriate. Although the current 6.9% assumed rate of return on investments for CTRS may be appropriate for the plan's circumstances, interest rates in the 7% to 8% range are not appropriate for discounting future liabilities.

• Base contribution requirements on a lower discount rate.

Contribution requirements should be based on a rate that reflects the protections in place for workers' pension benefits. They should not be based on investment returns, unless the assumed rate of return on investments is in line with protections in place for benefits. In Connecticut, pensions receive property right protections. The current 6.9% assumed discount rate remains too high. Liabilities should be discounted at a rate that is closer to a risk-free rate.

• Be proactive about not pushing costs onto future taxpayers.

Funding in K-12 education is not just an accounting exercise. It is also a reflection of our values. This notion can easily be applied to public pensions. When pension plans incorrectly measure the value of benefits, they place future taxpayers at risk of having to pay legacy costs when plans are not completely pre-funded. A previous paper by Yankee Institute showed how pension benefits are distributed unevenly across different groups of teachers. Our pension plans today also distribute costs unevenly across generations of taxpayers.



Introduction

According to a survey of economic experts conducted by the University of Chicago, 75% strongly agree or agree that pension liabilities reported by public employee retirement systems are understated. Moreover, 69% strong-ly agree or agree that "during the next two decades some U.S. states, unless they substantially increase taxes, cut spending, and/or change public-sector pensions, will require a combination of severe austerity budgets, a federal bailout, and/or default."¹

By its own measures, CTRS has unfunded liabilities that exceed \$17 billion, and the system currently has 52 cents for every dollar needed to pay for benefits accrued by its members as of June 30, 2018.² This deficit reflects pensions only and does not include retiree health insurance (commonly referred to as OPEB, or other post-employment benefits).³ The gap between what the system owes for accrued benefits and the assets it has on hand for paying obligations today and in the future represents more than \$31,000 for each public school student in the state.⁴

Given how the plan values pension benefits, unfunded liabilities are likely understated and do not accurately reflect the true investment risk and cost of these plans. Specifically, CTRS bases a key assumption used to estimate the value of future benefits (the discount rate) on expectations that trustees have for investment returns. CTRS is not alone in this regard; nearly all other defined benefit plans do the same. Financial economists including Stanford University's Joshua Rauh and American Enterprise Institute's Andrew Biggs have argued that linking these assumptions fails logic. Rather, they should be treated as different assumptions. Because public employees enjoy strong protections for pension promises, actuaries should use a discount rate that is closer to a risk-free rate.

This paper estimates CTRS unfunded liabilities for a range of discount rates. Because public employees in Connecticut have very strong protections in place for their pension benefits, the value of benefits are significantly higher than stated (by up to twice the value reported under the current assumed discount rate). Unfunded liabilities may be more than three times what is currently stated.

This paper is organized as follows: an explanation of how defined benefit plans work and the role that the discount rate plays, followed by a discussion about debates surrounding discount rates, results from the analysis and guidelines for policymakers and pension plan officials.

Defined Benefit Plans and the Discount Rate

Most public sector employees across the country, including members of CTRS, belong to traditional defined benefit plans. Traditional defined benefit plans (referred to as "DB plans" throughout) promise fixed monthly payments from point of eligibility payable for life. Benefits are defined as follows:

Benefit = m * YOS * FAS * (1 + COLA)

The benefit is a function of final average salary (FAS), years of service (YOS), and an accrual factor (m). Some plans also provide cost-of-living adjustments (COLA) to benefits.

For example, a public school teacher who retires with 30 years of credited service, finishes with a final average salary of \$80,000, and is enrolled in a DP plan that provides 2% of final average earnings for each year worked without any COLA is:

Annual benefit = (0.02) x (30,) x (\$80,000) = \$48,000

In practice, this retired teacher would receive monthly payments worth \$4,000, or higher with COLA.

Pension benefits to be paid decades later are earned for service performed by teachers today, and the costs to prefund future payments are operational costs today. Benefits under DB plans are not tied directly to contributions. For this reason, pension benefits accrued under DB plans are pre-funded (at least in theory). Both workers and employers make periodic contributions to the plan over time.

Required contributions = employee contributions + employer contributions

Actuaries periodically estimate required contributions for a pension plan and must employ various assumptions for determining the level of benefits that the employer and employee funds.⁵ If these assumptions are off target, or if contribution levels fall short of actuarial requirements, then the plan accrues a deficit over time.⁶ Subsequently, future contribution requirements may increase or decrease.

Even though DB plans are designed to be pre-funded, the CTRS plan has accrued substantial unfunded liabilities over time (Figure 1). In fiscal year 2000, the plan was 83.6% funded and accrued about \$5,800 per student in unfunded liabilities. According to the most recent actuarial valuation report (as of June 30, 2018), the plan's funded ratio has decreased to 51.7% and unfunded liabilities now exceed \$31,000 per student.

Figure 1: Connecticut Teachers' Retirement System funding

CTRS system funded ratios as percent and unfunded liabilities per student, fiscal years 2000-2018 (\$ adjusted for inflation)



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

As discussed below, the funding story is worse.

Funds from contributions are invested and accrue interest. By the time a worker retires, total funds for the worker (contributions plus investment earnings) should be sufficient to cover the costs of the stream of payments for his or her post-employment life.⁷ Assumptions about investment expectations are key factors for actuarial valuations. Another key factor is the assumption used to discount future liabilities to present value. These key concepts are discussed next.

The Discount Rate and Rate of Return on Investments

Two important assumptions for predicting the level of contributions necessary to fund a DB plan are the **rate of return on investments** (or interest rate) and the **discount rate**. While these terms are often used interchangeably in debates about the discount rate, they are distinct. The assumed rate of return is simply the expected return from an investment. The discount rate is used to determine how much one dollar in the future is worth today and is important for estimating the present value of future benefits. In DB plans, assumptions for these two rates are usually the same. That is, DB plans typically base assumptions for the discount rate for estimating the plan's liabilities on investment expectations.

From fiscal year 1987 until fiscal year 2016, CTRS's assumed rate of return was 8.5%. Subsequent the June 30, 2014, valuation, the board of trustees adopted a lower assumption for the rate of return of 8.0%.⁸ In 2016, the State Employees Retirement Commission voted unanimously to reduce the expected rate of return on the pension fund's investments even further, from 8.0% to 6.9%.⁹ The discount rate for valuing future liabilities is set to the assumed rate of return for investments and is also currently 6.9%.

Implications for Equity

Assumptions for the rate of return on investments and the discount rate have important implications for funding the pension plan. If investment returns fall below expectations, the gap between expected benefits and assets on hand to pay for benefits widens and future contribution requirements increase. But even if plans meet their investment marks, plans can (and often do) accrue debt if they underestimate the true cost of pension benefits (as would happen if the assumed discount rate is too high).

Pension benefits paid in the future are earned for service performed by workers today and represent operational costs today. An important public choice question that policymakers must weigh is whether taxpayers today should pay for the full cost of pension benefits accrued for services rendered today, or whether it's appropriate to shift any portion of these costs onto future taxpayers. Thus, cost valuation in pension finance reflects the value of equity.

Any cost for benefits that aren't paid by taxpayers when those benefits are earned, whether due to underestimating liability cash flows or not meeting investment expectations, shift to future taxpayers.¹⁰ Thus, assumptions for the discount rate have important implications for equity as well. As Biggs and Smetters note, an important policy goal is that "each generation of taxpayers should fully fund the benefits accruing to public employees at that time, rather than shifting those costs to future generations."¹¹ This type of equity is what GASB refers to as "interperiod equity." Some economists refer to it as "intergenerational equity." It is the idea that "taxpayers of today pay for the services that they receive and the burden of payment for services today is not shifted to taxpayers of the future."¹²

At the heart of achieving interperiod equity or intergenerational equity is the important question of whether the current discount rate (currently 6.9%) truly reflects the cost of the CTRS pension plan.

Pension benefits for public workers represent fixed promises payable for life. The important aspect about these plans that must be recognized is that pension benefits have, to varying degrees, protections.¹³ While public employers have an obligation to pay for benefits in full, there are typically no requirements for states and municipalities to fund pension plans in a particular manner or for the costs of providing pension benefits to be valued in a particular manner.

Correct valuation of the plan's liabilities is of utmost importance for adequately funding the plan. Thus, they must get assumptions about the discount rate right. The increased accumulation of unfunded liabilities over the last several decades for many public pension plans suggests that at least one of these assumptions have been off target.

Because of the strong protections in place for pension benefits, financial economists argue that future benefits should be valued using a discount rate that is closer to risk free. There are at least two ways to get the discount rate assumption right: continue to base future liabilities on investment expectations and lower the assumed rate of return, or treat the two assumptions independently and lower the discount rate while maintaining current expectations for investment returns.

The Discount Rate Debate

The assumed discount rate is an integral factor in determining contribution requirements for funding the pension plan. Vigorous debate abounds around which discount rate public pension plans should use. Some people argue that the appropriate discount rate is a function of asset management while others argue that the discount rate should instead be viewed as a function of liabilities rather than assets.

The discount rate as a function of assets

Debates about the discount rate are often framed as debates about what expectations plan trustees should set about investment returns. Generally, achieving a higher rate of return requires taking on greater investment risk. With lower expectations for investment returns, funds may be directed toward lower-risk investments. Over the last decade, public employee pension plans have been taking on more risk.¹⁴ A recent paper from the Federal Reserve Bank of Boston attributed about one-third of funds' total risk to low interest rates and underfunding.¹⁵

As stated, the assumed rate of return for the CTRS plan since 1987 was 8.5%. This assumption made sense in the 1980s and early 1990s because the yield on safe securities (such as a 30-year Treasury bond) was about the same level. Hitting the expected return did not require fund managers to forecast a return on riskier assets.

Figure 2 displays the historical yield on 30-year Treasury notes (blue line). The red line displays the assumed rate of return on pension investments for CTRS. In 1990, the yield on 30-year Treasury bonds was about 8% to 9%. There was little to no gap between the yield on this investment and the expected rate of return. Thus, pension funds could be invested in a low-risk instrument and safely meet the plan's expectation.

Over the next 25-plus years, the gap between the assumed rate of return and the yield on this Treasury bond grew dramatically, with the Treasury bond declining to below 2%. This gap represents the risk that the pension system must take on with investments to have any chance of achieving its expected return.





Source: : CTRS actuarial valuation reports; U.S. Department of the Treasury, Daily Treasury Yield Curve Rates, retrieved from https://www.wtreasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldAll; CTRS actuarial valuation reports

The discount rate as a function of liabilities

Financial economists frame the debate as how pension plans should view liabilities rather than as a function of assets. They argue that current accounting for pension plans falls short in capturing the full value of liabilities, consequently leading to underfunding. Biggs and Smetters (2013) observe a fundamental misunderstanding about financial economists' arguments in debates about the discount rate.

"...many believe that when economists argue that public pensions should not discount their liabilities at the 8% interest rate that pensions assume for their investments, they are claiming that actual investment returns will be lower than 8%. Similarly, some believe that because economists advocate using lower discount rates to value pension liabilities, they are arguing that public pensions should hold only low-risk investments in their portfolios. Neither belief is correct."¹⁶

In 2014 and 2015, GASB implemented new accounting standards that govern public disclosures on state and local retirement systems. Joshua Rauh, a financial economist at Stanford University, notes:

"... these standards still preserved the basic flaw in governmental pension accounting: the fallacy that liabilities can be measured by choosing an expected return on plan assets. This procedure uses as inputs the forecasts of investment returns on fundamentally risky assets and ignores the risk necessary to target hoped-for returns."¹⁷

This arrangement results in a disconnect between the true cost of benefits and how those costs are valuated and reported. Current accounting does not reflect the reality of the promises and creates a significant measurement problem in which state and municipal governments are making promises about pension benefits without properly calculating the cost.

Misunderstanding about the discount rate question stems from DB plans using the assumption for one (the rate of return on investments) as the basis for the other (the discount rate). These assumptions should be treated separately. Truong Bui and Anthony Randazzo use mortgage rates as an analogy to explain how valuing assets and liabilities are separate:

"... the price of a mortgage (the interest rate) isn't primarily based on how much the home's value will appreciate over time but is relative to the borrower's credit worthiness. The value of the asset (the home) and the liability (the risk of failure to repay) are separate."¹⁸

Just as the value of a home isn't the main factor in pricing a mortgage, the expected return on investing pension assets shouldn't be the main factor in pricing pension promises. The key factor should be risk and what protections are in place for workers who receive pension benefits. Assumptions for the investment returns and for valuing liabilities should be treated as separate and distinct assumptions.

Methods and Results

This paper estimates the liabilities for CTRS, using accounting methods employed by Novy-Marx and Rauh (2008), under a range of alternative discount rates.¹⁹ The analysis generates estimates by employing the following equation:

$L'=L_{CTRS}^{*}((1+r_{CTRS})/(1+r'))^{15}$

where L' represents the new estimate for the plan's liabilities, L-CTRS represents the liabilities as reported in the latest CTRS actuarial valuation, r-CTRS is the plan's assumed discount rate (6.9%), and r' is the adjusted discount rate. Following Novy-Marx and Rauh, the present analysis estimates liabilities over a 15-year horizon. This approach provides conservative estimates.²⁰

Which discount rate should be used? Unreasonably high discount rates artificially depress the expected costs of the pension plan and contribute to underfunding. Many financial experts would agree that 8.5% and 8.0% discount rates are unreasonably high in today's financial environment. The current 6.9% assumption is still unreasonably high for valuing liabilities because pension benefits have strong protections against diminishing them for retirees and current workers. Amy Monahan notes that courts in some states, including Connecticut, "have ruled that public pension plans create protectable property interests."²¹ Because benefits under these plans receive such strong protections, financial economists argue that the discount rate used for valuing liabilities should be lower and closer to a risk-free rate.

This argument for using a lower discount rate to value liabilities is independent from any assertions made about any expectations for investment returns. It is important for policymakers and stakeholders to realize that any discussion about expected investment returns is a separate and distinct discussion.

Figure 3 displays the value of pension promises under discount rates that range from 2% to 8%. The blue bar shows estimated liabilities as reported by CTRS.



Figure 3: Estimated cost of pension promises for CTRS under different discount rates, FY 2018 (\$ in Billions)

Source: Author's estimates; CTRS data retrieved from Cavanaugh Macdonald Consulting, LLC, "*Connecticut State Teachers' Retirement System Actuarial Valuation as of June 30, 2018, (Revised as of June 18, 2019),*" https://portal.ct.gov/-/media/TRB/-Content/StatisticsResearch/SR_ACTVAL18.pdf?la=en.

Based on the current assumed discount rate of 6.9% for CTRS, the estimated value of pension promises (actuarially accrued liabilities) is \$34.7 billion. A previous actuarial valuation report for fiscal year 2019 reported the plan's funding under the previously assumed 8.0% rate of return. Pension liabilities under the previous rate were \$31.1 billion. Lowering the assumed rate to 6.9% revealed an additional \$3.6 billion in pension promises not previously reported, implying an additional \$3.6 billion in unfunded liabilities.

While 6.9% may be an appropriate assumption for expected investment returns, economists argue this rate is still unreasonably high for valuing liabilities because pension benefits are guaranteed and enjoy strong protections against diminishing them. If intergenerational equity is a something that Connecticut citizens value, then CTRS should also consider separately lowering the assumption used to value the plan's liabilities.

Let's consider pension promises under a low-risk rate. The yield from a 30-year Treasury bond represents a very low-risk instrument. During 2019, the yield from a 30-year bond fluctuated between 2% and 3%.²² Estimated pension liabilities based on a 2% to 3% discount rate are about \$60 billion to \$70 billion, more than twice what is currently stated.

The gap between what the system has on hand and what it owes is greater than what's reported. Figure 4 displays unfunded liabilities and funded ratios over a range of discount rates.

Under the current assumed rate of return of 6.9%, estimated unfunded liabilities for the CTRS plan for fiscal 2019 were \$16.76 billion. Estimated unfunded liabilities based on a 2% to 3% discount rate are approximately \$40 billion to \$50 billion, or up to three times of what is currently stated.

The gap between unfunded liabilities under a 3% discount rate and the stated cost for fiscal year 2019 is \$26 billion. This gap will grow if interest rates continue to decline and pension systems do not change funding practices.

Financial economists often argue that stated unfunded liabilities are underestimated. Under current contribution levels, the pension plan is not being fully funded even while contribution rates have been climbing. Over the past decade alone, contribution rates for the state to fund CTRS increased from 15.2% in fiscal year 2008 to 27.8% in fiscal year 2018.²³ Connecticut taxpayers should expect contribution requirements to continue to increase in the future.



Figure 4: Unfunded actuarial liabilities and funded ratio (as a percent) for CTRS under different discount rates, FY 2018

Source: Author's estimates; CTRS data retrieved from Cavanaugh Macdonald Consulting, LLC, "*Connecticut State Teachers' Retirement System Actuarial Valuation as of June 30, 2018, (Revised as of June 18, 2019),*" https://portal.ct.gov/-/media/TRB/-Content/StatisticsResearch/SR_ACTVAL18.pdf?la=en.

Policy Options and Recommendations

States with large unfunded pension liabilities like Connecticut are in a bind. Their funding situations are likely much worse than stated. This paper estimates unfunded liabilities for CTRS under different discount rates and argues that under current contribution levels, CTRS is not being fully funded. Connecticut taxpayers should expect contribution requirements to continue to increase in the future.

To address funding challenges, pension systems should use accounting that reflects the reality of retirement promises. In Connecticut, pension promises are a protectable property right (Monahan, 2010). For this reason, financial economists argue that benefits should be valued using discount rates close to a risk-free rate. Currently, liabilities for Connecticut public school teachers are understated. Connecticut public officials should be commended for taking a necessary step of lowering assumptions for the discount rate and rate of return on investments from 8% to 6.9%. Decisions to lower the assumed discount rate are very difficult because they reveal a bigger funding problem, but they are needed. This move serves to reveal, at least partially, the true magnitude of the funding problem. This reduction in the assumed discount rate uncovered \$3.6 billion in pension debt. This change does not go far enough, however, and likely significantly more debt is hidden given the strong protections that the plan enjoys.

Below are some guidelines for policymakers and pension plan trustees to increase transparency and intergenerational equity:

• Report unfunded liabilities under a wider range of discount rates.

Under current GASB reporting requirements, CTRS reports its net pension liability using its current discount rate, plus the liability using discount rates that are 1 percentage point higher and lower than the current rate.²⁴ In addition, the Second Exposure Draft of the Proposed Revision of Actuarial Standard of Practice (ASOP) No. 4 includes recommendations for pension plans to disclose a low-default-risk obligation measure of benefits.²⁵ Pension plans in Connecticut like CTRS should, at minimum, report their liabilities under a broader range of discount rates, including a risk-free rate, and disclose the protections and guarantees that public workers have for pension benefits. Public pension plans do not have to confine public reporting to GASB requirements.

• Unlink assumptions for the discount rate and investment expectations.

Most or all DB plans base the discount rate on the assumed rate of return for investments, even though they are not obligated to do so. Every state and even different pension plans face different circumstances that can affect funding differently. In some cases, a 7% or 8% assumption for investment returns may be appropriate. Although the current 6.9% assumed rate of return on investments for CTRS may be appropriate for the plan's circumstances, interest rates around the 7% to 8% range are not appropriate for discounting future liabilities.

• Base contribution requirements on a lower discount rate.

Contribution requirements should be based on a rate that reflects protections in place for workers' pension benefits. They should not be based on investment returns, unless the assumed rate of return on investments is in line with protections in place for benefits. In Connecticut, pensions receive property right protections. The current 6.9% assumed discount rate remains too high. Liabilities should be discounted at a rate that is closer to a risk-free rate.

• Be proactive about not pushing costs onto future taxpayers.

In a paper I co-authored with James Shuls, we argue that funding in K-12 education is not just an accounting exercise.²⁶ It is also a reflection of our values. This notion can easily be applied to public pensions. When pension plans incorrectly measure the value of benefits, they place future taxpayers at risk of having to pay for legacy costs because funds are not completely pre-funded. A previous paper by Yankee Institute showed how pension benefits are distributed unevenly across different groups of teachers. Our pension plans today also distribute costs unevenly across generations of taxpayers.

Currently stated unfunded liabilities for CTRS are substantial. This situation places future taxpayers at risk for paying pension costs they did not create. Connecticut taxpayers concerned with intergenerational equity should consider options to pay down debt today. Otherwise, costs will increasingly be pushed onto future generations.

Unfortunately, most options available to public officials for paying down CTRS unfunded liabilities are not appealing and include:

- Raising taxes to pay for benefits
- Raising contributions for workers
- Cutting spending for other services
- Restructuring benefits
- Taking on debt to pay for debt
- Finding sources of revenue
- Continuing "business as usual" (do nothing)

One policy option suggested in a previous paper for the Yankee Institute is expanding educational choice, such as the introduction of an education savings account program for K-12 schools. Currently 65 private school choice programs operate in 29 states.²⁷ In virtually every program, the value of scholarships is set at a fraction of the per-student cost to educate the same students in the public K-12 system.²⁸ The difference represents savings in some form for taxpayers, and at least a portion of these savings could be directed to paying down pension debt.

To be clear, no single policy will solve a state's problems with pension debt. More than one option will likely be needed to pay down CTRS's pension debt.

Measuring pension liabilities in a way that's consistent with financial logic and private sector practice would be a good first step toward addressing any pension plan's funding problems. Once the true magnitude of the problem is revealed, Connecticut's public officials can get down to the business of fixing its pension systems so they serve all Connecticut workers and taxpayers more equitably.

Endnotes

¹ Chicago Booth IGM Forum. "U.S. State Budgets (revisited)," *University of Chicago* [survey], Aug. 26, 2014, <u>http://www.igmchicago.org/surveys/u-s-state-budgets-revisited</u>.

² Cavanaugh Macdonald Consulting LLC. "Connecticut State Teachers' Retirement System Actuarial Valuation as of June 30, 2018, (Revised as of June 18, 2019)," <u>https://portal.ct.gov/-/media/TRB/Content/StatisticsResearch/SR_ACTVAL18.pdf?la=en</u>.

³ Unfunded liabilities for CTRS Retiree Health Insurance Plan are \$3.05 billion. As is typical with many OPEB plans for public employees in other states, the plan is not pre-funded.

Cavanaugh Macdonald Consulting LLC. "Connecticut State Teachers' Retirement System, Retiree Health Insurance Plan, Funding and Plan Accounting Report, Prepared as of June 30, 2018," <u>https://portal.ct.gov/-/media/TRB/</u> <u>Content/StatisticsResearch/SR_GASB7418.pdf?la=en</u>.

⁴ Martin F. Lueken, "Growing Liability: How Connecticut Teacher Pensions Put Teachers, Taxpayers and Students at Risk," *Yankee Institute for Public Policy*, (September 2019), <u>https://yankeeinstitute.org/wp-content/up-loads/2019/10/Teacher-pensions-2-compressed-1.pdf</u>.

⁵ Valuation assumptions include the discount rate for liability cash flows, rate of return on investments, mortality, final average salary patterns, payroll growth, and retirement age. Of these actuarial inputs, the discount rate is the most influential and represents the focus of this paper. Gang Chen and David S. T. Matkin , "Actuarial Inputs and the Valuation of Public Pension Liabilities and Contribution Requirements: A Simulation Approach," *Center for Retirement Research, Boston College*, CRR WP 2017-4, (May 2017), <u>https://crr.bc.edu/wp-content/uploads/2017/05/wp_2017-4-1.pdf</u>.

⁶ Throughout the 1990s and 2000s, employer contributions fell short of annual required contributions. For instance, in the 1990s, ARC contributions ranged from 37% to 92%. It's also worth noting that public pension plans that paid their ARC in full every year starting in 2001 accrued significant debt in future years. While the median funded ratio in 2001 for these plans was 100%, the median funded ratio dropped to 98% in 2007 (the year before the Great Recession) and to 78% in 2014. Mary Pat Campbell, "Public Pensions: Why Do 100% Required Contribution Payers Have Decreasing Fundedness?" *STUMP* (blog), Aug, 19, 2017, <u>https://stump.marypat.org/ article/805/public-pensions-why-do-100-required-contribution-payers-have-decreasing-fundedness</u> (accessed 3/1/2020).

⁷ For further details about how these plans work, including benefit accrual, please see: Martin F. Lueken, "Growing Liability: How Connecticut Teacher Pensions Put Teachers, Taxpayers and Students at Risk," *Yankee Institute for Public Policy*, (September 2019), <u>https://yankeeinstitute.org/wp-content/uploads/2019/10/Teacher-pen-</u> <u>sions-2-compressed-1.pdf</u>.

⁸ The Board adopted new assumptions based on the plan's 2015 Experience Study. Cavanaugh Macdonald Consulting LLC. "Connecticut State Teachers' Retirement System Actuarial Valuation as of June 30, 2016, (Revised as of Nov. 15, 2017)," <u>https://portal.ct.gov/-/media/TRB/FormsAndPubs/ActuarialValuationRep2016pdf.pdf?la=en</u>. ⁹ Christopher Keating, "Pension Update: Expected Rate of Return Lowered," *Hartford Courant*, Dec. 15, 2016,

https://www.courant.com/politics/capitol-watch/hc-pension-update-expected-rate-of-return-lowered-20161215story.html.

¹⁰ Underfunding also occurs when other valuation assumptions are not met such as mortality, final average salary patterns, payroll growth, and retirement age.

¹¹ Andrew G. Biggs and Kent A. Smetters, "Understanding the Argument for Market Valuation of Public Pension Liabilities," *American Enterprise Institute*, (May 2013), <u>https://www.aei.org/wp-content/up-loads/2013/05/-understanding-the-argument-for-market-valuation-of-public-pension-liabilities_10491782445.pdf</u>.

¹² Government Accounting Standards Board, "The User's Perspective: Interperiod Equity and What it Means for You," June 2009, <u>https://gasb.org/cs/ContentServer?c=GASBContent_C&cid=1176156731381&d=Touch&pa-gename=GASB%2FGASBContent_C%2FUsersArticlePage</u>/.

¹³ Amy B. Monahan, "Public Pension Plan Reform: The Legal Framework," Education Finance and Policy 5 no. 4

(Fall 2010); 617-646, <u>https://www.mitpressjournals.org/doi/abs/10.1162/EDFP_a_00014</u>.

¹⁴ Heather Gillers, "Public Pension Plans Continue to Shift into U.S. Stocks," *Wall Street Journal*, Nov. 5, 2019, <u>https://www.wsj.com/articles/public-pension-plans-continue-to-shift-into-u-s-stocks-11572955200</u> (accessed 3/1/2020).

¹⁵ Lina Lu, Matthew Pritsker, Andrei Zlate, Kenechukwu Anadu, and James Bohn, "Reach for Yield by U.S. Public Pension Funds," *Federal Reserve Bank of Boston*, working paper SRA 19-02, (2019), <u>https://www.bostonfed.org/</u>publications/risk-and-policy-analysis/2019/reach-for-yield-by-us-public-pension-funds.aspx.

¹⁶ Andrew G. Biggs and Kent A. Smetters, "Understanding the Argument for Market Valuation of Public Pension Liabilities," *American Enterprise Institute*, (May 2013), <u>https://www.aei.org/wp-content/uploads/2013/05/-understanding-the-argument-for-market-valuation-of-public-pension-liabilities_10491782445.pdf</u>.

¹⁷ Joshua D. Rauh. "Hidden Debt, Hidden Deficits: 2017 edition." *Hoover Institution*, (May 2017): 1211-1249, https://www.hoover.org/sites/default/files/research/docs/rauh_hiddendebt2017_final_webreadypdf1.pdf.

¹⁸ Truong Bui and Anthony Randazzo, "Why Discount Rates Should Reflect Liabilities: Best Practices for Setting Public Sector Pension Fund Discount Rates," *Reason Foundation*, Policy Brief No. 130 (September 2015) <u>https://reason.org/wp-content/uploads/files/pension_discount_rates_best_practices.pdf</u>.

¹⁹ Robert Novy-Marx and Joshua D. Rauh, "The Intergenerational Transfer of Public Pension Promises." *National Bureau of Economic Research*, No. w14343 (September 2008) <u>https://www.nber.org/papers/w14343.pdf</u>.

²⁰ Novy-Marx and Rauh show that liabilities estimated in this manner produce lower bounds on the liabilities for each discount rate.

²¹ Amy B. Monahan, Public Pension Plan Reform: The Legal Framework, *Education Finance and Policy* 5, no. 4 (Fall 2010): 617-646, <u>https://www.mitpressjournals.org/doi/abs/10.1162/EDFP_a_00014</u>.

²² U.S. Department of the Treasury, "Resource Center: Daily Treasury Yield Curve Rates," <u>https://www.treasury.gov/resource-center/data-chart-center/interest-rates/pages/TextView.aspx?data=yield</u>.

²³ The system released an actuarial valuation report for fiscal year 2018 prior to passage of HB 7424 and reported that the state contribution rate for the system was 32.04% and unfunded actuarial liabilities rate was 27.50%. The updated valuation reported a lower employer cost rate of 27.77% and lower unfunded actuarial liabilities rate of 21.04%. The report did not explain these differences. Cavanaugh Macdonald Consulting LLC, "Connecticut State Teachers' Retirement System Actuarial Valuation as of June 30, 2018, (Revised as of June 18, 2019)," <u>https://portal.ct.gov/-/media/TRB/Content/StatisticsResearch/SR_ACTVAL18.pdf?la=en</u>. Gabriel Roeder Smith & Company, "Connecticut State Teachers' Retirement System Report on the Actuarial Valuation as of June 30, 2008," <u>https://portal.ct.gov/-/media/TRB/FormsAndPubs/ActuarialValuationRep2008pdf.pdf?la=en</u>.

²⁴ Cavanaugh Macdonald Consulting LLC. "GASB Statement No. 67 Report for the Connecticut State Teachers' Retirement System Prepared as of June 30, 2018," <u>https://portal.ct.gov/-/media/TRB/Content/StatisticsResearch/SR GASB6718.pdf?la=en</u>.

²⁵ Actuarial Standards Board, "Proposed Revision of ASOP No. 4 – Measuring Pension Obligations and Determining Pension Plan Costs or Contributions (Second Exposure Draft)," (December 2019). <u>http://www.actuarialstandardsboard.org/asops/measuring-pension-obligations-and-determining-pension-plan-costs-or-contributions-second-exposure-draft/</u> (accessed 3/5/2020).

²⁶ Martin F. Lueken and James V. Shuls, "The Future of K-12 Funding: How States Can Equalize Opportunity and Make K–12 Funding More Equitable," *EdChoice*, (January 2019) <u>https://www.edchoice.org/wp-content/up-loads/2019/01/2019-1-The-Future-of-K12-Funding-by-Martin-Lueken-and-James-Shuls.pdf</u>.

²⁷ EdChoice, "The ABCs of School Choice: The Comprehensive Guide to Every Private School Choice Program in America, 2020 Edition," EdChoice <u>https://www.edchoice.org/wp-content/uploads/2020/01/2020-ABCs-of-School-Choice-WEB-OPTIMIZED.pdf</u>.

²⁸ From their inceptions to fiscal year 2015, private school voucher programs and tax-credit scholarship programs, on average, generated about \$3,000 in fiscal benefits for taxpayers and school districts for each voucher and scholarship used. Martin F. Lueken, "The Fiscal Effects of Tax-Credit Scholarship Programs in the United States,: *Journal of School Choice*, 12 no. 2 (2018): 181–215, <u>https://dx.doi.org/10.1080/15582159.2018.1447725</u>.

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Bio

Martin Lueken is the director of fiscal policy and analysis for EdChoice, where he focuses on research and analysis of issues that pertain to school choice bills, current programs, and school funding. His work includes providing expert support and advice for policy makers in helping understand the fiscal impact of current school choice programs and potential fiscal effects of programs introduced in state legislatures. He has provided expert testimony and advice about fiscal issues for numerous states that have introduced education choice legislation. His work has been mentioned in various media and education-specific outlets, including The New York Times, The Wall Street Journal, Education Next, Education Week, and The 74.

Marty holds a doctorate in Education Policy from the University of Arkansas, a master's degree in Economics from the University of Missouri, and a bachelor's degree in Physical Education from Eastern Illinois University. He taught English for five years in Japanese public elementary and middle schools.



