

State debt and liabilities, a holistic approach

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Executive Summary

State and municipal governments faced greater scrutiny of their fiscal health in the wake of the Great Recession. However, government financial reporting, specifically the comprehensive annual financial report, can be further improved to reflect debts and liabilities accrued by state and municipal governments. Most liabilities can be organized into four categories: bonds, government employee pensions, government employee retirement healthcare, and deferred infrastructure repairs. At the state level, these liabilities total to approximately \$1.2 trillion dollars in bonded obligations, \$6 trillion dollars in pension obligations, \$1 trillion dollars in retiree healthcare obligations, and \$0.9 trillion dollars in deferred repairs.^{iiiiiv} This paper will outline the challenges governments face from each type of liability, strategies for improving reporting, and how best to manage them going forward.

Challenges Facing State Governments Leading into the 2020s

State pensions

Over the past two decades, state pension systems have become the largest and most troubling state liability. From 2002 to 2018, self-reported unfunded actuarial accrued liabilities (UAAL) increased from about \$101 billion to \$1.25 trillion, respectively.^v Using a risk-free rate, the UAAL increased from \$2.2 trillion to \$6 trillion. There are several factors that led to the increase: by explicit underfunding, underestimation of liabilities and thus inadvertent underfunding, and improvements in actuarial estimates of public pension liabilities. Central to these factors, and thus pension reform, is the discount rate used by public pension plans in estimating their pension liabilities.

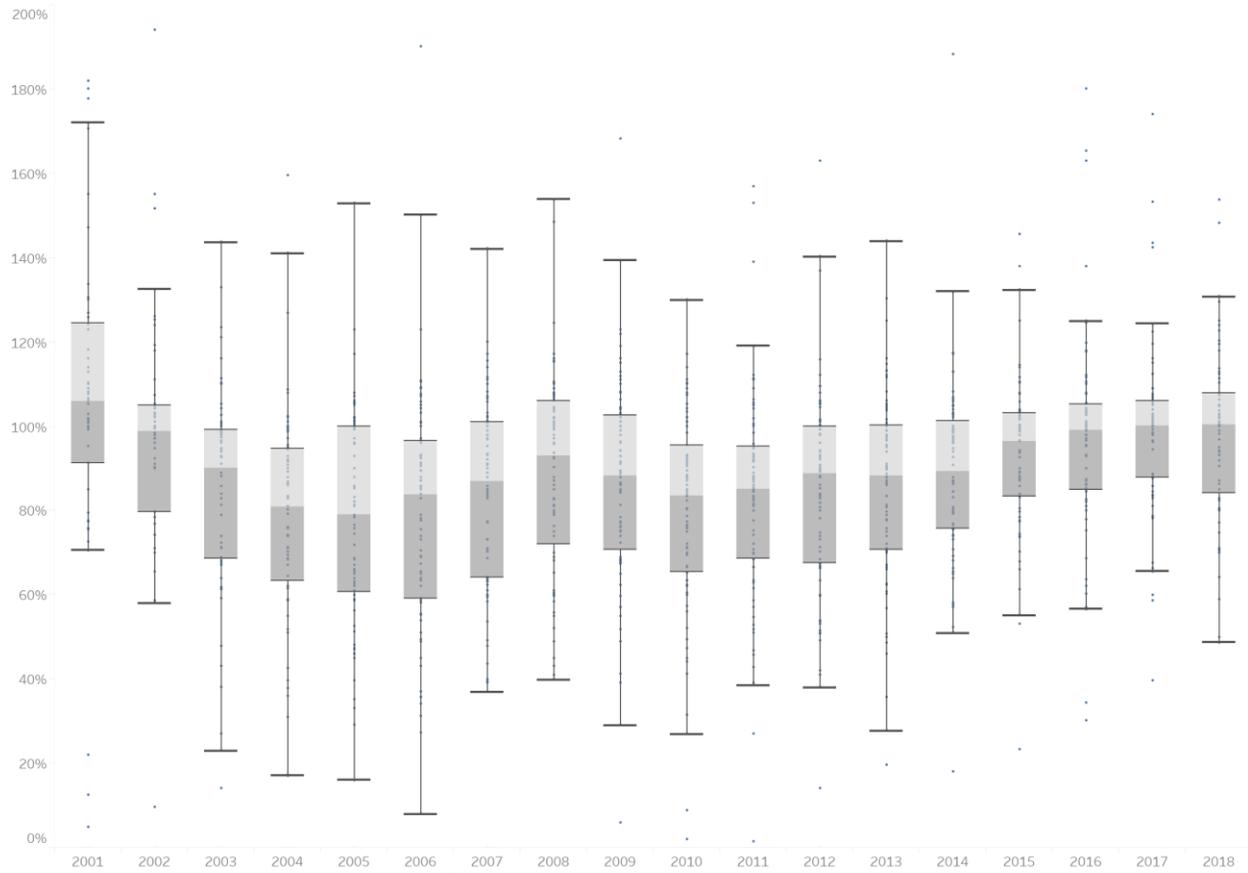
Explicit underfunding

In the wake of the 2001 recession, explicit underfunding of state pension plans was a common practice. The Governmental Accounting Standards Board (GASB) recommends amortizing unfunded retirement benefit liabilities over a 30-year time horizon through annual payments consisting of payments to current retirees and toward any unfunded pension liabilities. The annual payment, called the Actuarially Recommended or Determined Cost (ARC), is calculated based on the estimated liability. The ARC consists of two components, the estimated annual cost of current retirees and the cost of amortizing pension promises made to active employees and vested, former employees who have not yet retired. Employee contributions below 100% of the ARC contribute to UAAL.

In 2005 and 2010, the median ARC reached lows of 79 and 84%, respectively. Explicit underfunding has been one of the primary contributors to the accumulation of UAAL over the past two decades. However, since 2016 states contributed about 100% of the ARC on average, see figure 1. Additionally, the distribution of percent ARC paid fell over the past two decades. These changes represent a nationwide effort to reduce state pension UAAL.

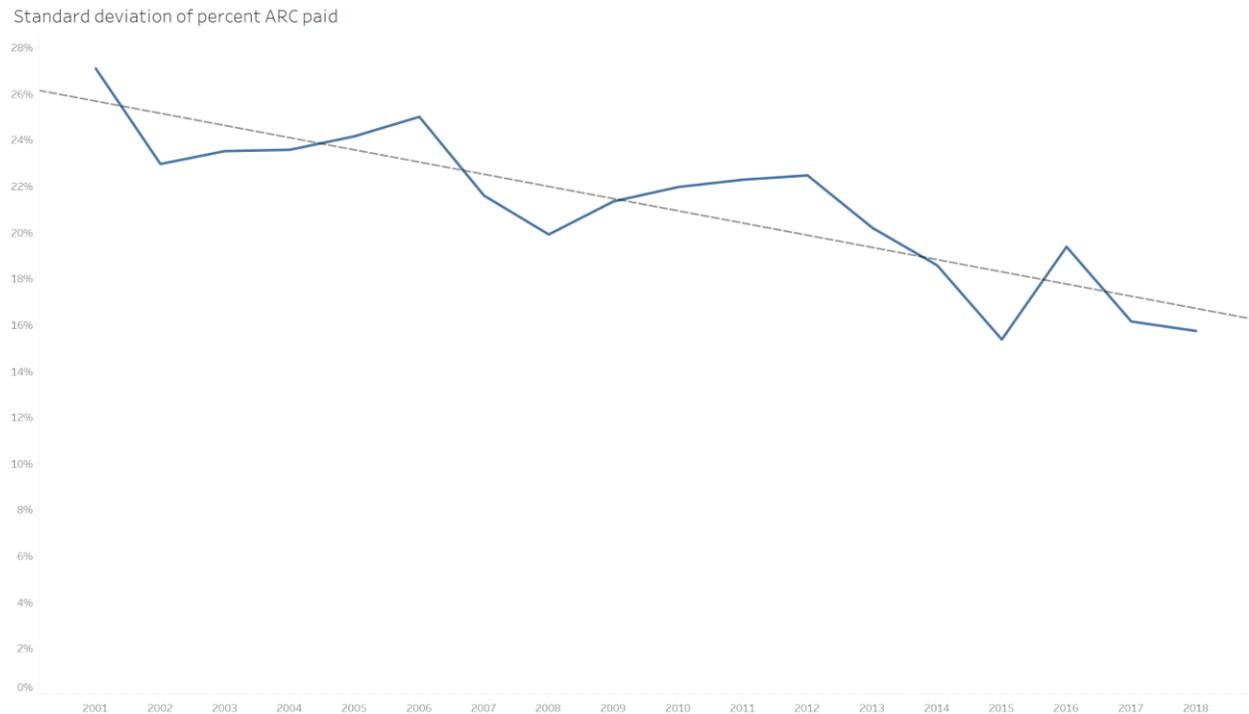
Figure 1, Percent ARC contributed by plan for all states, 2001 – 2018.

ARC paid from 2001 through 2018



*Note: There are 17 instances of the ARC exceeding 200% that are not visualized in this table, often related to the issuance of pension obligation bonds or other unusual circumstances. calculations based on the Center for Retirement Research at Boston College's public plans database.

Figure 2, Standard deviation of percent ARC paid by plan for all states, 2001 to 2018

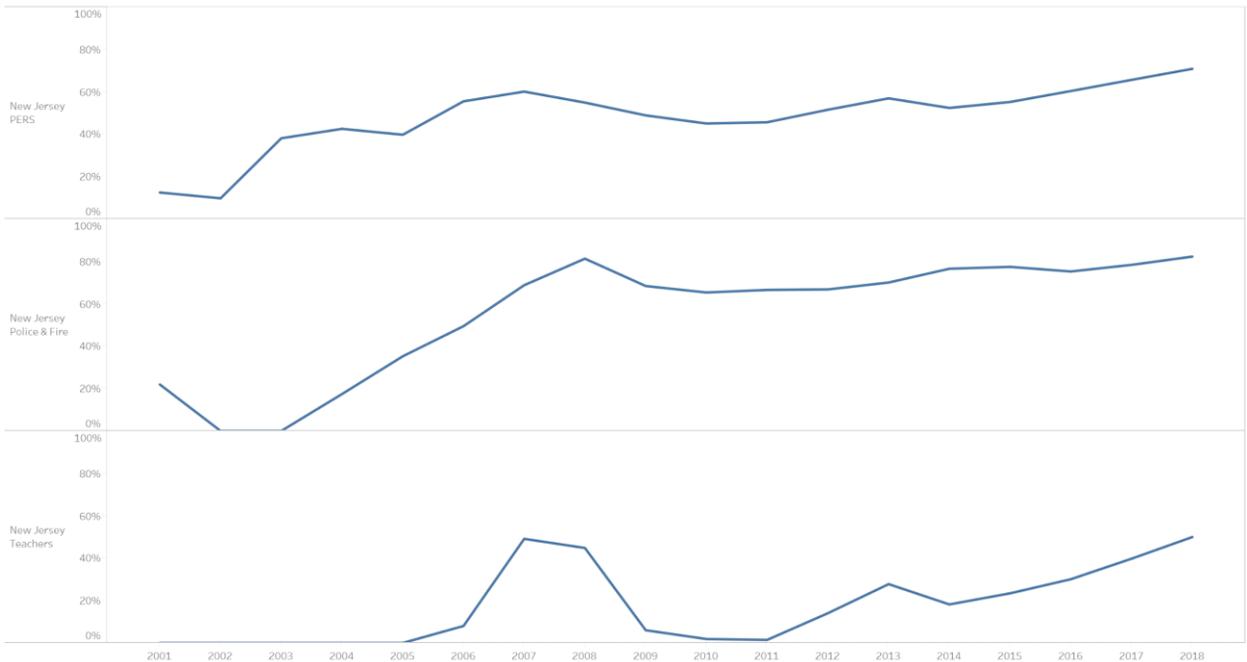


*Note: There are 17 instances of the ARC exceeding 200% that are not visualized in this table, often related to the issuance of pension obligation bonds or other unusual circumstances. calculations based on the Center for Retirement Research at Boston College's public plans database.

Even New Jersey, infamous for under contributing to their state pension systems, improved their annual contribution rate. Between 2001 and 2018, New Jersey's average percent ARC paid toward their three state pension plans was 40.4%, far below the next lowest, Kansas at 73.7%. The low average is due in part to the lack of pension contributions in the early 2000s. In 1997, New Jersey issued a \$2.8 billion pension obligation bond, shifting their pension liability to a bonded liability, in the hopes that the proceeds of the bond would accrete to a greater amount than the interest costs, an outcome that is still uncertain but unlikely.^{vii} After issuing the bond and reaching "full funding" in 2002, the state dramatically reduced its annual contributions toward its pension system. However, starting in 2011, New Jersey gradually contributed a greater percentage of their ARC, see Figure 3, rising to 68.7% in 2018. While New Jersey still ranks last in this metric, it represents a significant improvement over their historical performance.

Figure 3. Percent ARC paid for New Jersey's PERS, Police & Fire, and Teacher's Pension plans, 2001-2018

New Jersey pension systems, percent ARC paid from 2001 through 2018



Calculations based on the Center for Retirement Research at Boston College's public plans database.

The improvement in annual contributions has likely been driven by three major factors; incremental pension reforms following the 2007 recession, the longest running bull market in American history, and increased scrutiny of pension liabilities by credit rating agencies, investors, public policy researchers, and the public. However, if the ARC is underestimated, even governments making full contributions toward their pension obligations will develop unfunded liabilities over time.

Underestimation

Pension liability estimates are constructed using assumptions about a state's active and retired employees; these include mortality rates, payroll growth, distribution of service years, early retirement rates, disability rates, cost of living adjustments, investment return rates, and others. For pensions, the discount rate assumption is one of the most important assumptions as it is used to discount future pension costs into a present value liability, the actuarial accrued liability (AAL). Small changes in the rate of return assumption, used as the discount rate, can dramatically change the UAAL. For example, figure 4 compares the average discount rate of state pension plans by year, and UAAL as reported by states, to the UAAL re-discounted at different rates. As the discount rate approaches 2.25 percent, the UAAL of 2002 increases from \$101 billion to \$2,632 trillion. Over-discounting (underestimating) liabilities contributes to underfunding by reducing ARC payments.

Figure 4

Unfunded liabilities with varying discount rates from 2001 through 2018

	Avg. discount rate	UAAL	UAAL (4.5% discount rate)	UAAL (2.25% discount rate)
2001	8.03%	41,336,275	-1,080,042,972	-2,176,928,358
2002	8.02%	-100,951,339	-1,378,901,835	-2,632,317,249
2003	7.99%	-229,346,461	-1,572,096,241	-2,901,670,955
2004	7.96%	-274,451,752	-1,707,858,304	-3,139,230,594
2005	7.95%	-338,568,952	-1,859,320,688	-3,381,704,174
2006	7.94%	-359,910,231	-1,976,626,421	-3,598,144,665
2007	7.92%	-353,333,702	-2,083,293,629	-3,821,229,918
2008	7.91%	-432,570,490	-2,257,605,027	-4,095,547,427
2009	7.90%	-659,137,848	-2,570,614,893	-4,502,493,601
2010	7.85%	-752,188,392	-2,702,541,026	-4,700,372,480
2011	7.77%	-831,431,628	-2,778,117,641	-4,826,441,406
2012	7.72%	-929,957,254	-2,920,799,206	-5,032,765,305
2013	7.69%	-989,134,315	-3,045,338,321	-5,237,452,436
2014	7.69%	-988,579,431	-3,131,880,215	-5,427,845,686
2015	7.63%	-1,041,146,957	-3,254,562,890	-5,649,613,394
2016	7.54%	-1,174,058,260	-3,423,597,489	-5,918,286,909
2017	7.38%	-1,214,903,062	-3,464,970,556	-6,036,422,379
2018	7.25%	-1,248,196,892	-3,432,066,707	-6,035,887,808

Calculations based on the Center for Retirement Research at Boston College's public plans database.

There are two main schools of thought for selecting a discount rate for state and local pension systems; discounting equal to long term investment returns or bond interest rates. The investment rate of return method assumes that investments will compound over time at an estimated rate, usually based on historical experience, and thus those future pension investment returns can be deducted from pension liabilities. The bond rate method takes the combination of the risk-free rate, usually a US treasury bond rate, and the risk premium of the obligation and discounts by that figure. For state and local pension systems, the investment rate of return method is the standard method.

Private sector pension systems provide an example of both the bond and investment return discounting method. In 2014, a Government Accountability Office report explored the three major categories of US pensions: public employee pensions, private single employer pensions, and private multiemployer pensions.^{viii} Single employer pension plans discount using the average interest rate of high-quality corporate bonds, about 3 to 5% depending on the time frame selected. Multiemployer pension plans use a similar method to public pension plans, discounting by an assumed rate of return on investments, about 7 to 8%. Today, the single employer pension plans have a positive outlook whereas some multiemployer pension plans are

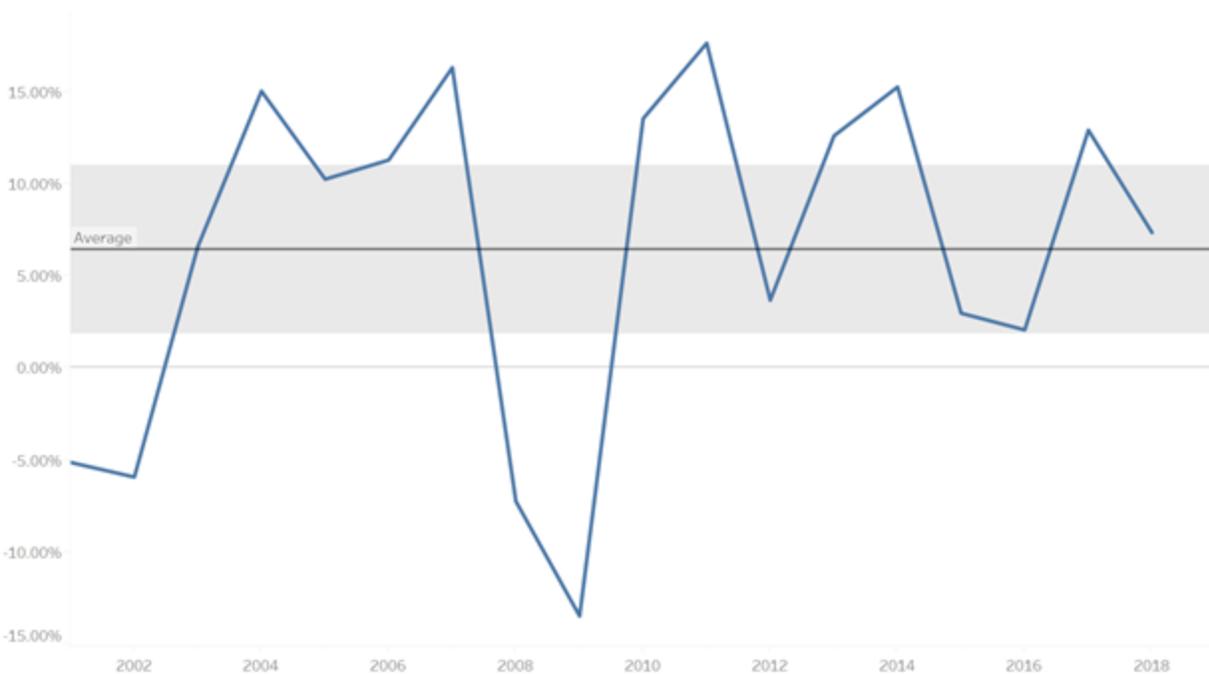
approaching collapse, threatening to take the Pension benefit Guaranty Corporation (PBGC) down with them.^{ix}

Between 2001 and 2018, the interest rate on high quality market corporate bonds steadily declined from 7.8 to 4% (except for the 2008 recession). In turn, single employer pensions likely increased annual contributions as their calculated ARC increased, making the past two decades more difficult but ultimately placing their pension systems in a favorable position going forward. Multiemployer plans used long-term investment returns to discount their pension liabilities, calculate their contributions, and experienced a decline in funding ratios more like public plans-- but without having taxpayers to help amortize the UAAL through larger employer contributions. The divergence is likely due in part to their different discounting practices, with discount by the lower, bond-based rate having a superior outcome.

Over the same period, the average discount for state pension plans decreased from 8.03% to 7.25%. However, the actual investment returns across state pension systems averaged about 6.4%, see figure 6. Expected and actual differ because of the two 2001-2019 recessions. The future average investment return for state pensions is likely a normal distribution centered around 6.4%, based on historical experience. The Pew Research Center and Voya Financial Advisors estimated the same, while J.P. Morgan and Wilshire estimated 6.5%.^x If state pension systems were to lower their discount rates to 6.4%, annual costs would increase, and unfunded liabilities would be more likely to amortize within a 30-year period. Unfortunately, state pension managers, state legislatures, and state employee unions have strong incentives to lower their investment return assumption.

Figure 5.

State annual investment returns between 2001 and 2018



Average investment returns in 2018, various time windows

Avg. InvestmentReturn 3yr	7.28%
Avg. InvestmentReturn 5yr	7.44%
Avg. InvestmentReturn 7yr	7.95%
Avg. InvestmentReturn 10yr	7.02%
Avg. InvestmentReturn 15yr	7.97%
Avg. InvestmentReturn 20yr	6.43%

Calculations based on the Center for Retirement Research at Boston College's public plans database.

For legislatures, a lower discount rate increases the ARC and presents the legislature with two, undesirable choices. First, the legislature can ignore the ARC and overtly underfund the pension, risking a political backlash. Second, the legislature can address it through changes to the state budget, such as allowing pension costs to crowd out other funding priorities or to increase taxes, which also risks a political backlash. By maintaining a high discount rate, legislatures can give the appearance of fully contributing state pension systems, paying 100% of the ARC, while preserving tax revenue to pursue their own political goals- such as programs or tax cuts promised to constituents. However, this simply pushes the undesirable choices, and thus backlash, onto a future legislature, as was the case for Illinois in 2015.^{xi}

From a pension manager or treasurer's perspective, lowering the discount rate can create the perception of poor pension management during their stewardship. For example, in 2017 the Mississippi pension fund, PERS, underwent a routine audit and the auditor recommended lowering the discount rate. In response, the PERS executive directors stated, "I feel 100 percent sure that we would have to increase the contribution rate or we would see a major deterioration in the funding status."^{xii} This is likely true, but not because the funding status is deteriorating but instead that the estimate is more accurate.

State employee unions are presented with a similar dilemma. State employee unions seek to secure the best possible salaries and benefits for the employees they represent. A high discount rate decreases the present value of future retirement benefit and thus reduces the estimated costs of union contracts, strengthening their bargaining position. Maintaining the

funds that support those future retirement benefits is a secondary concern due to the legal protections afforded state pension systems. For example, in Connecticut, unions worked with then Governor Rowland in 1995 and 1997 to underfund the state employee pension system in order to balance the state budget.^{xiii} The union could agree to this without fear of the state defaulting on its promised benefits due to the pension benefits being considered property and thus protected by property rights.

Given decades of explicit underfunding and the incentives aligned toward underestimating pension benefits, the investment rate of return method has not performed as intended. Furthermore, the investment rate of return method does not reflect the legal protections afforded to state employee pension benefits. To quote Joshua Rauh,

The logic of financial economics is very clear that measuring the value of a pension promise requires using the yields on bonds that match the risk and duration of that promise. Therefore, to reflect the present value cost of actually delivering on a benefit promise requires the use of a default-free yield curve, such as the Treasury yield curve. Financial economists have spoken in near unison on this point. The fact that the stock market, whose performance drives that of most pension plan investments, has earned high historical returns does not justify the use of these historical returns as a discount rate for measuring pension liabilities. – Joshua Rauh, Congressional Testimony.^{xiv}

From this perspective, the discount rate for state pensions should be a risk-free rate, such as a treasury bond. Applying a risk-free rate increases the estimated state UAAL to about \$6 trillion. A discount rate based on high quality municipal bonds may be more applicable to municipal pension systems, as those jurisdictions may be able to file for bankruptcy.

Hybridization and Self-correction

States and local governments around the country are considering “hybrid” pension plans either in place of or alongside their traditional pension plans. Hybrid plans usually consist of both a defined benefit (DB) and defined contribution plan (DC). Hybrid plans are often presented as a way of reducing costs or liabilities. However, hybrid plans are not innately more stable or less expensive than DB plans. Rather, the DB portions of hybrid plans tend to be more modern in the design: using lower discount rates, having benefit “spiking” protections, variable employee contribution rates, and other design improvements. One of the most important elements of hybrid plans is the ability for the DC portion of the plan to self-correct and prevent the accumulation of UAAL.

Self-correcting pension systems operate by modulating their annual benefits and or contributions based on the funding ratio of the plan. For example, a plan may have a benefit that varies on funding ratio with a benefit floor to protect state employee retirees, depending on the legal definition of the benefit. Alternatively, a plan may automatically increase employee contributions if the funding ratio drops below a threshold, scaling higher as the funding ratio declines. These approaches are not mutually exclusive, meaning a plan could use a combination of both variable benefit and variable contributions.

For most state employee systems employee contribution rates are fixed by contract of statute. In 2016, the Maine Public Employee Retirement System reformed their pension system to have both variable employee contribution rates and variable benefits, through COLA freezes.^{xv} Going forward, municipal and employee contributions can rise as high as 12.5% and 9%, respectively, depending on the health of the pension fund. If the rate increases are insufficient, COLAs are suspended until the fund recovers.

The “risk-sharing” created by reforms like this shift the political incentives in a positive direction for both liability management and asset management. For state employee unions, the best way to keep their member contributions low is to keep the funding ratio high. As the

changes to active employee contributions are automatic, negotiating budget deals where the state underfunds a pension with the understanding that the state must honor their pension promises becomes unpopular with active employees. Furthermore, politically motivated investment strategies, such as divesting from industries for political reasons, become less attractive as investment returns on pension assets would matter to state employees.

Wisconsin provides another example of a risk-sharing model. Wisconsin provides two retirement benefits, a relatively small DB paired with a variable benefit. The DB portion of the plan provides a traditional pension, whereas the variable benefit fluctuates based on asset performance. If the stock market declines, the variable benefit also declines. For example, following the 2007 recession, the annual cost of the system declined by more than \$4 billion.^{xvi} While difficult for some retirees, the decline helped stabilize and replenish Wisconsin's pension fund quickly while other states continued to struggle.

State and local Bonds

Relative to other state liabilities, bonded liabilities are more stable in terms of their growth, highly transparent in terms of their disclosure and debt service schedules, and, perhaps most importantly, exposed to a degree of market forces. Credit rating agencies and the investment community pressure state and local governments to engage in more fiscally prudent behavior in exchange for high credit ratings and thus less expensive access to capital. However, governments that are desperate for funds often turn to complex bonds with difficulty to estimate future costs. These bonds are often presented to the public as “cost saving” or “cheap money” rather than the gamble they are.

Purpose of state and local bonds

In most state and local financial disclosures, the term “debt” is reserved for general obligation bonds as those are backed by the full faith and credit of the government. This is a narrow definition of debt but, in recognition of the distinction, other bonds are referred to as “obligations.” In 2019, bonded obligations for the most recent state CAFRs and bond disclosures were compiled into the State Bonded Obligations report, estimating that states had accrued an estimated \$1.2 trillion in bonded obligations.^{xvii}

Of this \$1.2 trillion, about general obligation bonds account for \$434 billion, governmental activity bonds account for \$217 billion, business-type activity bonds accounted for \$194 billion, and component unit bonds accounted for \$295 billion. Within each of these four categories, there is an immense diversity of maturities, interest rates, debt service structures, and contractual agreements that complicate broad comparisons between states, further complicated by the different reporting methodologies of each state.

Bonds allow governments to borrow funds from investors and to repay those funds at an agreed upon interest rate, structure, and other contractual stipulations found in the covenant. As an example, a state might issue a \$5 million-dollar general obligation bond for general funding purposes that has a 5-year maturity, level debt service, and an interest rate of 5 percent. The proceeds of the bond could be used to fund various priorities within the general fund so long as it does not violate the covenant, additional terms of the agreement.

Bonds can also provide states with the ability to smooth costs. For example, a hypothetical bridge requires annual maintenance, minor rehabilitation every 10 years, and major rehabilitation every 30. In years where the state must rehabilitate the bridge the annual cost will spike, but tax revenue will not. If the rehabilitation projects are funded via bonds with 10-year maturities, the annual cost will be smoothed. This also applies to reactive expenditures, such as emergency expenditures in response to natural disasters or tax revenue shocks for external forces, such as recessions.

The cost and risks of bonding

However, borrowing comes at a cost, an interest cost. The interest rate on a bond can vary across time and on different parts of the bond structure. Two of the most common types of bonds, in terms of interest rates, are fixed and variable interest rate bonds. Fixed interest rate

bonds apply a set interest rate to the debt service schedule. For some fixed interest bonds, different periods within the debt service schedule have different rates. For other fixed interest bonds, different series within a bond have different set rates. Variable interest rate bonds have interest rates that fluctuate, usually relative to the LIBOR rate or treasury rate. Variable interest rate bonds add a layer of complexity to the bond where the total cost to the issuer is unknown, leading to potentially disastrous situations.

Variable interest rate bonds have a range of possible total interest costs. Politicians, other public officials, and special interest groups have a strong incentive to focus on the rosier tail of the distribution of potential costs. If these groups can convince the policy makers and or the public that the cost of bonding is lower than average or below the cost of not funding the project, the bonds are more likely to be approved. Unfortunately, governments that are already experiencing fiscal distress are often drawn into compounding their challenges by the promise of “cheap” money.

For example, between 2003 and 2007, the Chicago Public School system (CPS) issued \$1 billion dollars of adjustable rate bonds with interest rate-swaps. The adjustable rate bonds were proposed as a way of saving \$90 million dollars in interest cost relative to traditional, fixed income bonds. However, an analysis by the Chicago Tribune estimated that it increased the interest cost by over \$100 million.^{xviii} The initial estimates assumed that interest rates on the “auction-rate” bonds would correlate with the interest rate swap, meaning that CPS would only pay the fixed interest to the bank. However, the interest rates on the auction-rate bonds increased with the 2007 recession while the interest rate swap, based on LIBOR, remained low. CPS was liable for the divergence. The Chicago Public School system has a myriad of fiscal challenges and the additional cost associated with these adjustable rate bonds did not help.

Variable interest rate bonds are like any other debt instrument, they are tools that can be useful in the right context and with moderation. The bonds issued by CPS underwent an approval process, as most bonds do, but the risk and, ultimately, the cost of the bonds was either not clearly communicated or not identified. If the bonds had been presented to the school board with an analysis of the range of outcomes, based on the historical divergence between LIBOR and municipal bond interest rates, perhaps the amount of variable interest rate debt would not have grown six-fold between 2003 and 2008.

Pension obligation bonds are often presented as cheap, or even free, money through arbitrage. In theory, pension obligation bonds can lower a state or municipality's net liabilities by issuing the bond at a low interest rate and investing the proceeds of the bond into assets that have a higher average rate of return than the interest on the bond, creating an “expected spread.” However, if the investment returns do poorly, the pension obligation bond compounds the pension liability, increasing the government's net liability. Ideally, governments should limit POBs to a part of a long-term investment strategy, issuing fixed interest rate POBs only when interest rates are at extremely low, as in the case of Oregon in 2009.^{xix}

Unfortunately, states and municipalities facing fiscal duress appear to be the governments most willing to risk compounding their fiscal woes, regardless of timing or strategy— gambling at best, kicking the can down the road at worst.^{xx} Illinois has struggled with fiscal challenges for decades, in part due to large, unfunded liabilities. Rather than address the source of their growing unfunded liabilities, Illinois issued pension obligation bonds of \$10 billion, \$3.5 billion, and \$3.7 billion in 2003, 2010, and 2011.^{xxi} High profile pension obligation bonds issued in response to fiscal distress have largely tarnished the reputation of pension obligation bonds in both the eyes of investors and the public.

In addition to variable interest cost and bond proceed investment performance, the cost of debt service relative to the anticipated revenues may change-- a government's ability to pay. A state or municipality may experience decades of fast and steady economic growth, issuing bonds on the assumption that the economy and thus tax revenues will continue to grow rapidly. However, changes in the global economy, technology, demographics, and culture can change

the trajectory of even the richest areas of the country, eroding their ability to service their liabilities without decreasing expenditures on other government services.^{xxii}

Market forces

Unlike pensions, OPEB, and deferred transportation maintenance, state and local bonds must be sold to willing investors in the municipal bond market. The municipal bond market pressures governments toward fiscal responsibility through interest costs. Investors provide capital with an interest rate, the perceived combined rate of inflation, risk of default, and a directional risk of future changes in the inflation rate. When a government's fiscal health declines due to an over extension of the government credit, weak economic outlook, or, more commonly, a mixture of both, credit rating agencies, such as Moody's, Standard & Poor's, and Fitch, may issue credit rating downgrades. These downgrades and outlooks signal to the municipal bond market, in addition to their firms own research, the risk inherent in a government's bonds. As the perception of risk increases, alternative sources of municipal bonds, such as other governments with less risk, become relatively more attractive investments at equal interest rates. Interest costs and political pressures to maintain a stable to positive credit outlook may buffer states and local governments from overextending their bonds, but that is dependent on accurate, timely, and accessible financial disclosures to the public.

Covenants

Covenants create additional contractual obligations for the bond issuer. Covenants are highly flexible, allowing issuers to customize the terms of the bond, limited by existing contractual, legal, and constitutional requirements. Covenants are typically used to create assurances to investors in order to secure the sale of a bond or to lower the interest rate of a bond, such as the promise to not dilute the issuers credit or exceed an agreed upon debt service ratio. However, in some cases, covenants are a way a government imposes fiscal responsibility onto future governments.

Connecticut has a long history of underfunding their state pension systems, resulting in the lowest funding ratio in the country as of 2018, controlling for differences in discount rates. In 2007, Connecticut issued a bond that imposed a covenant requiring the state to pay the full actuarial required contribution on the pension liability until the maturity date of the bond to improve the Teacher Retirement System funding ratio. The proceeds of the bond, \$2 billion, were invested into the Teacher Retirement System. Even if the bond does not successfully achieve arbitrage by the maturity of the bond, it's impact on the fiscal health of the state has likely been positive by ensuring that the state contributes the full ARC to the teacher retirement system.

In 2018, Connecticut entered another bond covenant aimed at reigning in their bonded obligations, the second highest per capita in the country as of 2019.^{xxiii} Connecticut suffered six credit downgrades between 2016 and 2018, related to the accrual of large unfunded liabilities associated with state employee retirement benefits.^{xxiv} The bond covenant contractually binds Connecticut to a series of fiscal reforms, including a cap on bond issuance and a volatility cap on income tax revenue that contributes excess income tax receipts into the budget stabilization fund.^{xxv}

These covenants were intended to communicate to credit rating agencies and investors that Connecticut has moved past its perpetual budget crises and is now on a path to fiscal stability. So far, the covenants, along with incremental pension and OPEB reforms in 2018, appear to be successful. In 2019, two credit rating agencies upgraded their outlook for Connecticut's general obligation bonds, reversing the 3-year trend of negative to stable outlooks.^{xxvi}

Alternatives to bonding

Just as there is a diversity of bonds, there is also a diversity of alternatives to bonding. Three of the most common alternatives are budget stabilization funds, emergency funds, and

trusts. Each of these alternatives is best suited to different fiscal challenges that all governments will face at some point.

Budget stabilization funds are ideal for managing tax revenue volatility. Some tax structures are more volatile than others and susceptible to different types of economic shocks. For example, a state that levies high corporate income or capital gains taxes have more volatile revenue during recessions than states that rely on broad based sales or taxes.^{xxvii} Governments should develop budget stabilization funds proportional to the historical volatility of their revenue, reducing need to issue bonds during economic downturns and other predictable shocks to their revenue.

For less predictable expenditures, such as natural disasters or pandemics, emergency or disaster funds can be an effective alternative to issuing bonds. For example, Colorado requires the state and its municipalities to maintain an Emergency Reserve Fund, equal to at least 3 percent of fiscal year spending.^{xxviii} Establishing targets for emergency funds is difficult as the nature, time, and cost of a disaster are unknown.

Lastly, there are some functions of government that have volatile year to year expenditures. Transportation and school construction projects can produce spikes in expenditures that are often smoothed by issuing bonds to fund the project. However, a well-managed trust can provide a similar benefit. Funds are appropriated annually or from a dedicated revenue source to the fund and withdrawn as needed. Instead of having the funds today and servicing debt for five years, funds would be appropriated for five years and then spent. The funds would be invested so that they would benefit from investment returns, as opposed to the government paying interest costs.

State Other Post-Employment Benefits (OPEB)

State and local governments often provide retirement benefits in addition to their pension systems, called “other post-employment benefits” (OPEB). OPEB is an umbrella term for a diverse set of benefits ranging from health insurance, disability health insurance, supplemental health insurance, vision insurance, dental insurance, to life insurance. A recent estimate places state OPEB liabilities at \$1 trillion dollars.^{xxix} Due to the diversity of OPEB plan designs, per capita unfunded liabilities range from \$0 to about \$18,500 per capita. Furthermore, this range is heavily skewed toward 10 states; Alaska, New Jersey, Hawaii, Delaware, Connecticut, New York, Illinois, Michigan, Vermont, and California, see Figure 6. For most other states, OPEB plans do not represent a large portion of their total liabilities. However, the benefit structure of most OPEB plans are difficult to estimate. In addition to the risks pensions must account for, OPEB plans must also account for the healthcare trend rate, which is subject to shocks from healthcare utilization, prices, regulations, and coverage changes. The additional variables make OPEB obligations a riskier type of obligation than pensions, all else being equal.

Figure 6.

State	Total Risk-Free Unfunded Liabilities Per Capita	Ranking, descending order
Alaska	\$18,507.35	50
New Jersey	\$14,479.26	49
Hawaii	\$12,256.65	48
Delaware	\$10,382.89	47
Connecticut	\$9,387.12	46

New York	\$6,512.50	45
Illinois	\$5,029.56	44
Michigan	\$4,856.09	43
Vermont	\$4,644.04	42
California	\$4,213.14	41

Source: <https://www.alec.org/app/uploads/2020/01/OPEB-Web.pdf>

Actuarial estimation for OPEB

As earlier explained in the state pensions section (subsection Underestimation), actuarial estimates of retirement benefit liabilities are constructed using assumptions about future mortality rates, payroll growth, distribution of service years, early retirement rates, disability rates, cost of living adjustments, investment return rates, and other variables. However, OPEB estimation has an additional variable to contend with, the healthcare trend rate. For OPEB estimation, the healthcare trend rate is more important than the discount rate for most plans.

There are two primary reasons for this. First, most OPEB plans operate as pay-as-you-go plans tend to have 0 to 5% funding ratios, paying the annual normal cost and choosing not to fund future obligations. As a result, most OPEB plans apply low discount rates, usually based on their prevailing municipal bond rate in pay-as-you-go, which are closer to normalized, risk-free liabilities compared to self-reported pension liabilities. Second, variations in the healthcare cost trend often contribute larger actuarial gains and losses on a per point basis. For example, in an actuarial valuation of the New York City Health Benefits Program for fiscal year 2018, a 1 percent increase and decrease in the discount rate produced a range of actuarial gain and loss of \$34,237 billion whereas the range for a 1 percent increase and decrease in the healthcare trend produced a range of \$45,007 billion.^{xxx}

The healthcare cost trend is, itself, an aggregation of a multitude of factors outside of a state or local government's control. The trend consists of healthcare prices and utilization; augmented by gross domestic product, regulation, monetary inflation, and even the national political environment. A 2016 article in the North American Actuarial Journal, Accuracy of Long-Range Actuarial Projections of Health Care Costs, analyzed the errors of the US Office of the Actuary's (OACT) national health expenditures (NHE).^{xxxi} The author notes,

“The improvement in forecast accuracy since 1995 could be interpreted as indicating possibilities for future methodological gains. Conversely, the rather large errors in “historical” NHE suggest that measurement of health spending is inherently difficult and unstable, so that greater precision may not be possible or meaningful. ... Given the inherent uncertainty in long-run economic projections, it seems unwise to expect significantly better precision from health spending forecasts”

Put simply, healthcare is an immensely complex industry with an equally complex legal and regulatory regime with both the industry and its regulation constantly evolving in new and unexpected directions, making prediction both difficult and potentially impossible to improve. This uncertainty is layered on top of the uncertainty associated with more traditional defined benefits, pensions, which has already proven difficult for most governments to manage thus far.

Limits on healthcare trend rate growth

Most actuarial models assume a precipitous decline in the healthcare trend rate over the next decade. This assumption is due to the fact that healthcare expenditures cannot outpace GDP growth indefinitely, as that would result in healthcare expenditure exceeding 100 percent of GDP at some point in the future. Instead, the healthcare expenditure trend will converge to the long run GDP growth rate.

For example, New York City's New York Health Benefits Program has accrued over \$90 billion dollars of unfunded OPEB liabilities, a far larger obligation than most states. In 2013, the New York Health Benefits Program valuation estimated that the healthcare trend rate for pre-Medicare plans would decline from 9.5% to 5% between 2013 and 2023.^{xxxii} 2018, the plan's valuation estimated that 5% in 2028.^{xxxiii} In 5 years, the estimated point where we would reach a healthcare trend rate of 5% had moved up 5 years.

Errors in estimating future costs of the benefit, even small ones, could dramatically impact OPEB liabilities and present budget challenges down the road for New York City. This is not a criticism of the estimates. They are reasonable from the perspective that healthcare is limited by income and competition with other goods, such as housing, food, transportation, and other costs. In 2018, healthcare accounted for 17.7% of GDP but the eventual equilibrium is unknown, it could be 20 to 30 percent GDP.^{xxxiv}

State Deferred Maintenance of Capital Projects

In late 2019, America's Trillion-Dollar Repair Bill: capital budgeting and the disclosure of state infrastructure needs, part of the Volcker Alliance's Truth and Integrity in Government finance project, estimated that states had accrued an estimated \$873 billion in deferred maintenance.^{xxxv} Whereas unfunded pension liabilities highlight the importance of conservative actuarial assumptions and unfunded OPEB liabilities highlight the importance of estimating and limiting variability of actuarial assumptions, deferred maintenance liabilities highlight the importance of improving our state financial disclosures. Relative to all other liabilities, deferred maintenance liability offers the most fertile ground for reform-- and recommendations within America's Trillion-Dollar Repair Bill provides an excellent framework for it.

New construction, maintenance, and deferred capital improvements

States and local governments own capital assets vital to the provision of public services, such as schools, roads, police stations, and other structures. Each year, these assets require maintenance and, potentially, improvements. When appropriations or bond proceeds are insufficient to meet these demands, governments develop gaps in maintenance and/or modernity of their assets.

The quality of these structures, in terms of both modernity and physical integrity, modulate the impact of the taxpayer dollars. For example, a poorly maintained road or a road that lacks modern safety improvements may have a higher rate of accidents and fatalities than a similar road without deferred maintenance or capital improvements.

On the other hand, it is possible for states and local governments to overextend themselves, such as building roads and bridges that are either underutilized or simply pull traffic from another, serviceable road. Worse than either, governments may inadvertently prioritize new, less useful construction over addressing deferred maintenance on heavily utilized assets.^{xxxvi}

When state or local governments face fiscal challenges, they tend to restructure their net liabilities to a more deferred structure. Examples of this include: issuing pension obligation bonds to reduce or deferred annual pension contributions, deficit financing by issuing bonds to cover general purpose revenue shortfalls, reducing pension contributions to fund other budget priorities. Currently, these actions identifiable in CAFRs or other supporting documents, such as actuarial valuations and official statements for recently issued bonds.

However, it is far more difficult to know if a government has deferred maintenance and capital improvements to fund other budget priorities, has fewer demands for new construction or capital improvements, or is restricting its new construction due to a weaker than expected economic outlook. In most cases, it is only clear that a state is investing less than it has in the past. Ideally, state governments would conduct regular valuations of their existing assets, retrospective analyses of their utilization, cost, and potential redundancies, prospective analyses of alternative capital assets, particularly if the utilization trend is decreasing and costs are increasing, and differentiate between new construction, maintenance, deferred capital improvements, and deferred maintenance. This would assist with capital investment prioritization and good government advocacy efforts.

Policy Recommendations for State Debt and Liabilities

Recommendations for state pension plans

The policy recommendations in this section are presented in order of impact, from most impactful to least impactful. The majority of these recommendations can be implemented in conjunction with one another. Pension reforms yield benefits that can take several years to materialize as they do not reduce liabilities that have already accrued as pension benefits have strong legal, sometimes constitutional, protections. That said, the earlier reforms are implemented, the larger their impact will be.

Defined Contribution Plans

Many states pension plans can be closed and replaced with defined contribution plans, in much the same way that private sector pension plans have been largely supplanted by 401k retirement funds. DB plans, pensions, have some benefits over DC plans, such as risk sharing across vestees and protection from surviving one's retirement savings. However, DB plans both provide greater portability and, most importantly, resolve the incentive challenges.

"Transition costs" are often cited as a deterrent to switching to a DC plan. GASB recommends amortizing the UAAL of a closed pension plan using a shorter time frame than an open pension plan. Doing so increases the ARC, in the same way that choosing a 15-year mortgage instead of a 30-year mortgage increases monthly payments.^{xxxvii} However, the cost of fully funding the state pension system is the same. Furthermore, states are not legally forced to reduce their amortization period.

The transition to a DC plan may reduce or increase annual costs depending on the generosity of the match relative to the generosity of the pension plan. In other words, it's possible to create a DC plan that is more expensive than a DB plan. The greatest boon of transitioning to a DC plan is that it eliminates the state's ability to over discount future benefit costs and thus under contribute to their benefit plans. The cost a DC plan is experienced in the present, contributing a contractually or legislatively prescribed match with every paycheck, protecting state employee's retirements and taxpayers in the process.

Bond based discount rates

State and local governments that continue to provide defined benefits should calculate those benefits using a risk-free, bond-based discount rate. At minimum, states should adhere to the discount practices like those outlined by FASB for single employer plans, as they have proven to be more robust than the public sectors current approach, such as discounting by the rate of return of AA municipal bonds with maturities between 10 and 20 years. Ideally, states should discount their pension liabilities relative to their inability to default and apply a discount rate based on the Treasury bonds. A discount rate based on the bond approach would increase the estimated UAAL and, in turn, increase the projected ARC associated with state pension

plans. If states increase their ARC payments to match their new estimates, the lower discount rate will result in state pension plans reaching full funding quickly, protecting promised state employee benefits.

Self-correcting pension plans

State and local governments that continue to provide defined benefits should reform their retirement benefits to have self-correcting features. For DB plans, this could include automatic increases in employer and employee contributions depending on the funding status of the plan, as seen in the Maine state employee retirement system. However, hybrid plans have the additional benefit of being able to have flexible payments based on the funding of their plan, as seen with the Wisconsin state employee retirement system. Ideally, the self-correction would have risk-sharing across all stakeholders, meaning the employer, active employees, and retirees, ensuring that all stakeholders share an interest in the fund's health and investment performance.

Recommendations for state bonds

Budget stabilization fund management

Budget stabilization funds, sometimes referred to as "rainy day funds", can provide protection against the worst types of bonding, such as deficit bonding. Stabilization fund "adequacy" is best determined by historical tax revenue. Budget stabilization funds usually have withdrawal conditions, such as a recession.^{xxxviii} How tightly or loosely defined these conditions are can deny governments access to the fund when there's legitimate cause for withdrawal or erode the fund through continuous withdrawals due to structural budget deficits.^{xxxix} In both cases, states and municipal governments are pushed into the municipal bond market due to either being unable to access funds or having already depleted funds when they need them most. Outside of macroeconomic downturns, states and municipalities should be very restrictive against withdrawal from their stabilization funds paired with required contributions to their fund if it is below their volatility based target. During macroeconomic downturns, the funds should be easily accessible to reduce the probability of deficit bonding or higher or new taxes.

Bond caps

Bonds can be serviced through involuntary revenue, voluntary revenue, or a mixture of both. Involuntary revenue comes from taxes or mandatory fees, usually general obligation bonds or government activity bonds. On the other hand, voluntary revenue comes from fees associated with services freely chosen, usually business type activity bonds or component unit bonds. If the voluntary revenue comes from fees or subscriptions related to the service, voluntary revenue back bonds can provide two advantages over involuntary revenue back bonds; they likely adhere to the benefit principal and they are further exposed to market forces. Thus, bonding caps are best applied to tax supported bonds that are disconnected from the use of the bond proceeds. When bonding caps are applied too broadly, states and municipal governments create alternative debt instruments that tend to have less detailed disclosures. The transparency required to issue a bond on the municipal bond market and for that bond to be recorded in the MSRB database, EMMA, has value, both in terms of improving market information and for holding governments accountable.

Recommendations for OPEB management

The policy recommendations in this section are presented in order of impact, from most impactful to least impactful. The majority of these recommendations can be implemented in conjunction with one another. The earlier reforms are implemented, the larger their impact will be.

Phase out OPEB liabilities

For most state and local governments, estimated OPEB liabilities are already small relative to their budgets. For these governments, it is possible to phase out OPEB for new hires. Most public sector professions are able to retire at a similar age as their private sector counterparts and thus raising the minimum retirement age to 65 would either eliminate OPEB liabilities or dramatically reduce them. If OPEBs are also either not present for those who are Medicare eligible or phased out beyond the Medicare eligibility, the liability will be eliminated.

Alternatively, state and local governments could continue to allow early retirement and access to their health insurance plans but without explicit and/or implicit subsidy. This can be accomplished by increasing the employee portion of the health insurance premiums to the point where the retiree internalizes their full cost to the plan. In 2014 and 2016, Kansas and South Dakota pursued this reform, respectively, and eliminated their OPEB liabilities.^{xl}

Restructure OPEB liabilities to be more predictable

If a state or local government chooses to continue to provide an OPEB plan, the benefit structure can be changed to be more predictable. The primary goal of this reform would be to remove the need for predicting the healthcare trend rate, the future healthcare costs and utilization, with a secondary goal being to limit the benefit to the early retirement window. For example, a government could provide an explicit healthcare subsidy indexed to inflation for individuals who retire before age 65 or meet the criteria for disability retirement. This would reduce the number of relevant variables for estimating the OPEB liability, reducing the risk of underestimating future costs.

In 2015, the New Jersey pension and Health Benefit Study Commission proposed replacing their OPEB plan with an explicit subsidy. The new subsidy would be equal to the current value of a gold plan or the recently repealed Cadillac tax threshold, indexed to inflation going forward, deposited into a reimbursement retirement account (RRA).^{xli} Retirees would use the funds in their account to purchase health insurance of their choice from the healthcare exchange, ideally customized to their individual needs.

The report stressed “a state budget so burdened by employee benefits would not be able to weather a recession or permit the State to do what is necessary to promote the general welfare of its citizens.”^{xlii} For states facing large unfunded liabilities, especially those with large unfunded OPEB liabilities, this is not a trivial concern. In a recent report by the American Legislative Exchange Council, California’s total OPEB unfunded liability grew by 66% in a single year.^{xliii} Ideally, liabilities should grow roughly proportionally with the rest of governmental expenditures that should, in turn, grow proportionally with the economy that supports the government.

Prefund OPEB trusts

In 2017, the majority of OPEB plans operate as pay-as-you-go, with 101 out of 132 state OPEB plans had 0% funding.^{xliv} Governments that choose to continue to provide subsidies and that have restructured those subsidies to be more predictable should establish OPEB trusts, if they have not already, and prefund their liability. Trusts can reduce the cost of providing an OPEB benefit through investment returns. There is potential for a fund performance-based savings for the employer and bonuses for the retiree. For example, a higher than 100 percent funding ratio could trigger automatic decreases in contributions, with the decreases being rolled back when the fund dips below 100 percent again. Prefunding also provides states and local governments the ability to smooth over shocks, caused by either actuarial losses due to misestimation or actual losses, such as new regulations or taxes on health insurance.

Create an OPEB/pension trade-off

Within the public sector, there are professions that are physically demanding or where the ideal average age for the profession is lower than most other professions and thus early

retirement may improve the public services rendered. However, health insurance costs before age 65 can act as a significant barrier to early retirement, even when states facilitate early retirement through relatively low service retirement requirements. Furthermore, pension plans often discourage early retirement by calculating pension benefits using the last 2 to 3 years of an employee's earnings, which tend to increase based on years of service. For OPEB plans that have more predictable benefit structures, it is possible to provide access to OPEB plans to early retirees without increasing a government's liability using a trade-off. If the present value of the pension penalty is equal to the present value of the OPEB plan, then the trade-off would result in a net OPEB liability of around \$0, plus or minus the propagated errors of the actuarial assumptions. By increasing the number of years used to calculate an employee's pension benefit, increasing the multiplier to compensate the lower average, and providing the ability to pay for healthcare through their future pension payments, barriers to early retirement can be removed without incurring additional costs to the state or local government.

Recommendation for infrastructure needs

This section echoes the call to action set forth in America's Trillion-Dollar Repair Bill, specifically the standardization and disclosure subsections. In the early 2000s, many states began hosting their pension actuarial valuations online, providing good government advocates with low cost access to detailed reports on state pension. A decade later, OPEB valuations followed suite, shortly after a report detailing an estimated 1.5 trillion dollars in unfunded state and local OPEB liabilities in 2007.^{xv} Between 2010 and 2020, there were waves of pension and OPEB reforms and research built on actuarial valuations played a pivotal role. If, in the early 2020s, states were to improve their financial disclosures related to infrastructure needs in a standardized, comprehensive manner, good government advocates would be able to identify problematic trends in the management of state and local assets.

GASB 34 and 34 modified approach

At a minimum, states should disclose what they should have spent on maintenance, what they spent, and how much deferred maintenance they have currently accrued. These would be similar metrics to the ARC, contribution, and UAAL of pension and OPEB valuations. For the total deferred maintenance, GASB 34 recommends that state and local governments present the total value of their assets if in good condition and their current depreciation, often referred to as total capital assets at historical cost and total accumulated depreciation or some other variant of assets and their depreciation. GASB 34 modified recommends governments set a predetermined condition for their assets, such as a "B" as defined in the ASCE Infrastructure Report Card, and to estimate the annual cost required to maintain that condition.^{xvi} Just under half of states use the modified approach for some assets, primarily bridges and roads, and about 6 percent of local governments are estimated to.^{xvii} Between knowing how much depreciation is currently outstanding and how much a state is contributing toward its maintenance relative to its target contributions, it would be possible to measure the annual accrual of deferred maintenance.^{xviii} However, the impact of applying both statements is contingent on the estimates being comprehensive, meaning that it covers all public assets regardless of revenue source, and their definitions of assets and estimation methodology being similar across governments to facilitate comparisons.

Inventory and prioritization

State and local governments, particularly state governments, should develop comprehensive datasets of all public owned assets, including transportation. Each asset should have its estimated annual cost, annual contribution, current depreciation, and its priority relative to all other capital assets. Priority could be defined as score based on utilization, availability of alternatives, current depreciation as a percentage of predetermined value, percent increased

probability of mortality at current depreciation relative to predetermined value, and other indicators deemed important by the government. Supporting documents, such as the most recent valuation of the property, the assumptions used to estimate the value of its current depreciation, and the reasoning behind the priority score should also be available. In theory, the process of quantifying, prioritizing, and publicizing will result in more sound capital management and empower the public to hold policy makers accountable for deferred maintenance.

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