POLICY BRIEF

Funding Public Pensions

Is full pension funding a misguided goal?

BY TOM SGOUROS

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FOR A FAIR AND INCLUSIVE SOCIETY

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ABSTRACT

Public pension systems across the United States are, and have been, in crisis. But, to a larger extent than is widely acknowledged, the crisis is the result of the accounting rules governing both these plans and the governments that sponsor them. These rules are designed to insure against risks that public pensions systems do not face, while simultaneously failing to insure against the risks they do face. The rules also encourage "reforms" that frequently do not improve the financial situation of a given pension system. This is not just deplorable, but a recipe for making a bad situation worse—precisely what we've seen over the past few decades. A hybrid accounting system could provide a more accurate picture of a system's financial health while reducing the waste of overfunding. It could relieve unnecessary financial pressures on thousands of governments across the nation while still preserving the integrity of their pension systems.

THE PROBLEM: UNDERFUNDED PENSION SYSTEMS

Across the nation, public pensions are in crisis, and have been so for a long time. Funding pension costs is a political issue in cities, counties, and states from California, to Illinois, to Rhode Island. The rising expense of public employee pensions has become a political hot button justifying cuts to education and other necessary government investments, causing acrimonious debate, court cases, protest marches, and more. All the recent incidents of municipal bankruptcies have been blamed, at least in part, on pension obligations. Most famously, this was the case in Detroit, Michigan, but has also been true in the cities of Stockton and Vallejo in California, Prichard, Alabama, and Central Falls, Rhode Island.

The city of Chicago is currently feeling some of the warning tremors. According to its own estimates, the city's various pension funds have only half the funds in hand needed to pay its pensions. This leaves a $28.6 billion difference between the assets and the present value of the debt to all the current and future retirees in the system.[1] This difference, known as the "unfunded liability," was cited as the primary reason that Moody's, the bond-rating firm, downgraded Chicago's bond rating to "junk" status in May of 2015.[2]

The other common measure of a pension system's health is the ratio between the assets and the future liabilities, known as the "funding ratio." Chicago's funding ratio hovers around 50 percent, but the condition of the pension funds managed by the state of Illinois is even worse, showing a 39 percent funding ratio, with $111 billion worth of unfunded liability.[3]

Pension Funding Ratio
CalPERS 2014

$$\frac{\text{Total Assets}}{\text{Estimated Total Liability}} = \frac{\$301 \text{ billion}}{\$394 \text{ billion}} = \text{Funding Ratio } 76.3\%$$

CalPERS Annual Report 2015, https://www.calpers.ca.gov/docs/forms-publications/cafr-2015.pdf

Funding ratio calculation for CalPERS, 2014. "Total assets" is the value of the pension fund today, and "Estimated total liability" is the estimate of the future liability of the current employees whom are owed a pension. This is an estimate over several decades, so there are a lot of assumptions built in, and a great deal of uncertainty.

These are just the cases that make the headlines. In thousands of other governments across the country, pension contribution increases are a constant source of fiscal stress, resulting in cuts to schools, infrastructure, and increases in taxation. Despite the stress of added payments, the problem is not going away. America's public pension systems are, on average, only 74 percent funded as of 2014, with only $3.6 trillion in assets on hand to pay $4.8 trillion in liabilities, an unfunded liability of $1.2 trillion.[4] These governments have only a fraction of the assets on hand to make all the pension payments they have promised to their members. Retirement benefits, state and municipal budgets, and taxpayers are jeopardized. It is a crisis all around.

And yet, is it really true? A close look at the Detroit bankruptcy shows that it really had far more to do with the politics of Michigan's suburbs and the Governor Rick Snyder's feelings about the city than it did with the mathematical reality of the city finances.[5] The narrative of runaway pension obligations sinking an ailing city's finances is simply not supported by the facts, which had much more to do with a sudden loss of state support and ill-advised interest-rate swaps.[6] Long-

term debt due decades in the future cannot cause insolvency today even if it is a sign of trouble to come. Insolvency is the result of being unable to pay current obligations; long-term debt is just a threat.

Detroit's long-term debt of $18 billion was the headline number for the bankruptcy proceedings, but the pension system accounted for less than 20 percent of that, and that was only using very conservative assumptions about the discount rate and demographics. The actual cash-flow issue that triggered the bankruptcy was a $198 million shortfall in fiscal year 2014, a number easily explained by a $194 million decline in revenue—the largest component of which was changes in state policy that cut revenue sharing by $56.5 million—and $547 million in termination fees from swaps deals. The cost of running the city's pension systems had actually declined in the previous two years. Detroit's pension contribution in 2013 was $78.3 million, a slight drop from the 2012 contribution of $86.1 million, though still above the $65 million average payment of the previous five years.[7] Obviously the city's willingness to enter into the swaps was a symptom of financial pressure, and it is certainly true that the pension system was among the sources of that pressure. But as we will see, the pressure was applied by the pension accounting rules in place, much more than the mathematical reality of the payments to be made.

Cases of other cities used to illustrate the pension crisis provide equally misleading stories contradicted by a closer look. Stockton, California, seems to have been sunk not by pension costs, but by the foreclosure crisis, by some expensive city investments like a sports arena and hotel that did not pay off, and by an ill-advised gamble.[8] The purpose of the gamble was to reduce pension liability, but it was this gamble that went wrong, not the pensions.[9]

Central Falls saw its crisis precipitated by devastating cuts in state aid in 2009 and 2010, and a balloon payment worth 40 percent of the city's annual budget due in 2010 from a 1990 bond.[10] Prichard, a poor town near Mobile, Alabama, could hardly have been sunk by its pension costs, since they had not been paid in years. During its first round of bankruptcy in 1999, Prichard officials "admitted that it had not made payments into its employees' pension fund for years and had withheld taxes from employees' pay checks, but had not submitted the withholdings to the state and federal governments."[11]

Obviously, these cities were all stressed fiscally, but how and why did it come to be that public employee pensions were argued to be primary causes, when this was not the case? Part of the reason is that the pension funds in these cities were known to be underfunded by the accounting standards used to evaluate them, and those standards use normative language and measures to describe the situation.

A pension plan is "underfunded" and the government deemed not "fiscally sound" if it does not have the assets currently on hand to pay all of the future liabilities, clearly implying big problems ahead.[12] The unfunded liability provides a convenient measure of the degree of the problem, and since the liabilities of any pension system are typically large compared to the size of the budget, the unfunded part of that liability often seems immense. For example, the Illinois annual budget is in the $55–60 billion range, an uncomfortable comparison with its pension funds' liability of almost twice as much. Nationally, pension liabilities are in the trillions, even if the precise number of trillions is heavily contingent on analyst assumptions.[13]

Unfortunately, the widely-used measures of pension assets and liabilities are more complicated, less complete, and less reliable than they are typically presented to be. Where the measurements are accurate, they are commonly misinterpreted. They ignore important sources of system strength and create perverse incentives to system managers. They serve not only to exaggerate the problems facing pension funds, but also provide a poor guide to addressing those problems. Certainly the current funding situation of most pension plans could be improved and certainly there exist pension systems that really are in danger of collapse. However, might there be needless damage done by constantly predicting impending collapse for so many others?

WHY ARE THERE ACCOUNTING RULES?

It is worth reviewing the recent history of the accounting rules themselves. This will help to understand how the accounting rules and the choices that created those rules affect the pension debates.

The accounting rules for public pension systems are established by the Governmental Accounting Standards Board (GASB). This is the private body of accountants that defines the Generally Accepted Accounting Principles (GAAP) in use by local and state governments in the United States.[14] (See figure on page 8.)

Old-age pensions were among the reforms advocated by the socialists, communists, and the Progressive movement in the United States during the 19th century. In the latter years of the century, private employers around the country adopted the idea, some prompted by labor unrest, others prompted by the desire to avoid it.

Government pensions have a longer history. Pensions for disabled and retired military personnel were common decades earlier. George Washington prevented a mutiny in the Continental Army by intervening personally in a dispute over pensions during the Revolution. The granting of pensions to civilian government employees, however, marched in step with similar advances among private industry, starting with New York City's establishment of a disability pension system for its police in 1857 and advancing through several of the nation's large cities. By 1917, 85 percent of the nation's cities with populations over 400,000 had some form of police pension.[15]

The states were a bit slower than the big cities. Massachusetts was the first state to establish a pension system, in 1911, and by 1929, there were only 1,003 retired individuals receiving pension benefits from only five states. The pace quickened substantially with the onset of the Great Depression, and plans were established quickly enough that by 1935, when Social Security was introduced, there were over 400,000 pensioners across the country receiving benefits in 32 states.[16]

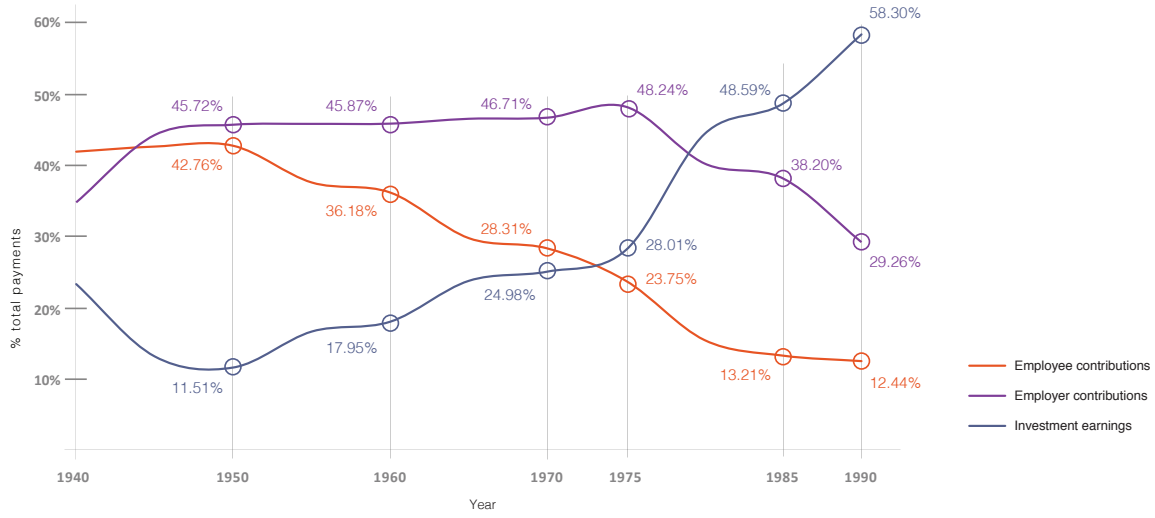
By the end of the 1930s, many government employers across the country were offering pensions to their employees. Many offered them on a pay-as-you-go basis, with payments drawn from tax revenue, without an associated pension fund, or with a relatively small fund whose purpose was only to manage cash flow. Some of these were funded by special dedications of tax revenue, such as fines, permit fees, or, in at least one city, dancing school licenses.[17] Over time, out of fear that these pension commitments would balloon in decades to come, many plans moved to an actuarial system of funding pensions, with a pension fund whose income would pay much of the pensions, and by the 1980s, this transition had been made for most plans.[18]

Because of the widely varying nature of the accounting systems used, it is difficult to make blanket statements about the state of pension funds at the time. Some consistent data is available from the Census Bureau, which began a survey of state and local government employee retirement systems in the 1940s. Early data from that survey show that investment earnings were substantially overshadowed by plan contributions from employers and employees until the 1980s, implying that most plans were not funded on an actuarial basis until then.

In the new era, a wide variety of accounting standards were used to assess the health of these pension funds. There were different ways to estimate the long-term liabilities, the marginal cost of a new employee, the value of the assets, and even the lifespan of the employees. Comparing one fund to another was challenging where it was possible at all. In 1994, GASB sought to address this problem with their Statements 25 and 27. These established, for pension plans and their sponsoring governments respectively, that actuarial data be included in fund annual statements, and strongly discouraged managing plans on a pay-as-you-go basis. They dictated that a plan calculate an "Actuarially Required Contribution" (ARC) according to their formula, and specified how a government should report whether or not it had contributed that amount to the plan fund.

Pension Fund Earnings by Revenue Source

Percent of total revenue



US Census Bureau State and Local Government Employee Retirement System Survey, as complied by Jun Peng. *State and Local Pension Fund Management.* Boca Raton, FL: CRC Press, 2009

Earnings from state and local pension funds. (Dollar values in millions.) Until the 1980s, investment earnings from pension funds did not play the largest role in funding pensions, many of which were pay-as-you-go systems with small funds used for managing cash flow rather than for generating investment income.[19] You can see the importance of investment income growing substantially over time, but really picking up momentum in the late 1970s.

The effect of GASB 25 and 27 suggested that the nation was undergoing a slow-boiling pension funding crisis. Many governments were not making the ARC demanded by their pension fund actuaries, and future liabilities seemed colossal.[20] Debates raged, and continue to rage, about the proper discount rate to use to calculate future liabilities of systems, and whether pensions were viable at all. Some plans were closed, others scrapped in favor of simple savings plans now called "defined contribution" (DC) plans,[21] while others were funded with bonded debt.[22]

After these reforms, despite the changes in incentives and standards, the unfunded liabilities continued to mount. Faced with what seemed to be a rising tide of red ink, GASB acted again in 2012, with Statements 67 and 68, again separated to apply to the fund and their sponsoring government, respectively. By adding specificity to the rules, these statements created a greater degree of uniformity across pension plans. However, they also create a much more demanding set of rules for predicting future liabilities. For example, GASB 68 removed a government's discretion to choose among the methods used by actuaries to allocate the marginal cost to the fund of an employee's time on the job and put strict controls on the discount rate that a pension system must use to estimate its long term liabilities.

GASB 67 also codifies what was more or less standard practice for actuarial accounting, completely excluding from consideration future contributions to the system from future employees or future employers. In essence, an unfunded liability calculated under these conditions, asks how much the sponsoring government will owe if the system is closed tomorrow and all current pension debts paid off over the ensuing decades. However, most systems will not be closed tomorrow and will continue to receive contributions from both the employees and employers for decades to come. This makes an unfunded liability potentially useful as a planning value, but not a good prediction of actual payments to be made, as we will see.

It is important to recognize the source of the pension funding crisis. Obviously, our nation—like all the others since the beginning of time—suffers from improvident politicians. There have been many skipped or shorted payments into the nation's public pension systems. Financial market crises have also done important work to increase the pressure on pension funds. The financial market turmoil of 2000–2001 was especially severe, and the losses of 2007–2008 have not been won back by many funds. For example, CalSTRS, the fund for California teachers, was fully funded as recently as 1998, before the popping of the tech bubble in 2000–2001.[23]

Skipped payments and disappointing investment returns are only part of the story. For many funds, these only exacerbated an original funding shortfall due to the transition between the pay-as-you-go model and the actuarial model. For governments making that transition, pension commitments already existed from the pay-as-you-go period. These commitments were made to employees who had not made contributions to the pension fund, not through any fault of their own, but because that was not how the system worked during their careers. Thus, many funds were established with a significant unfunded liability at the outset. In an accounting sense, this might be considered the original sin.[24]

But what is the source of the feeling of crisis that so dominates the discussion of pensions today? As with Detroit, debt due in the distant future is not a crisis today, even if it is a cause for concern. To a large extent, the source of the crisis is the accounting rules themselves and their misapplication by policy makers and ratings agencies. The GASB statements themselves are bland and even seem thoughtful, but the uses to which they have been put somewhat less so.[25]

PROBLEMS WITH ACCOUNTING RULES

"The pension fund could run dry," is a common enough talking point that it could be made about almost any pension fund in the country. A 2016 Google search for "pension fund run dry" provides ten hits, eight of which name Pennsylvania, New Jersey (twice), California, Chicago (twice), Texas, and Alabama with the remaining two hits leading to articles about the national pension funding crisis. Some of these plans named in these articles may be in real trouble, but reading them suggests that most of the writers are under the mistaken impression that a system funded at anything less than 100 percent is necessarily in danger of running out of money at some time in the near future.

"The state's pension goliath, the California Public Employees' Retirement System, had $281 billion to cover the benefits promised to 1.3 million workers and retirees in 2013. Yet it needed an additional $57 billion to meet future obligations."[26]

"Before the crash, retirement systems were underfinanced (they did not have sufficient funds to pay promised benefits), but the day of reckoning was distant."[27]

" 'Their benefits are in question,' said Gary Wagner, a professor of economics at Old Dominion University."[28]

Some experts will see these as alarmist statements. GASB members themselves might say these writers are misunderstanding the rules, even if they agree with the conclusions. The GASB Statements 67 and 68 specifically say they are only about reporting and do not dictate funding. And yet, stories like these appear across the country on a near-daily basis. The clear conclusion is that the effect of GASB rules is not just on the construction of a balance sheet, but on the interpretation of the numbers found there and the actions of the parties who make those interpretations: policy makers, citizens, or bond-rating agencies.

If GASB itself is not the enforcer of misinterpretations, if the enforcer is city council members preening about their soi-disant fiscal responsibility, or analysts at Moody's determined to justify a downgrade, or newspaper columnists looking for a good hook, they are doing so with tools supplied by GASB. It is disingenuous to erect a framework of tough rules and disavow their consequences. In this case, the consequences are a drive to full funding, whatever the cost.

It is crucial to understand, now and during the discussion to come, that the goal of the GASB rules is not to bankrupt governments, or to eliminate pension systems. At their root, the GASB rules are meant to create an accounting framework through which the cost of government and the cost of any individual employee are made clear. Unfortunately, the framework erected has created more problems than it has solved. The problem is not merely that the rules are commonly misinterpreted. GASB accountants have acted to insulate public plans from risks they do not face, while simultaneously failing to insure them against risks they face every day. Furthermore, by trying to bring clarity to the accounting, the rules undermine the benefits of aggregation—the whole rationale for a defined-benefit pension plan.

Again, this is hardly meant to say that there have not been improvident politicians and unwise bureaucrats, but the pension "crisis" currently affects responsible and irresponsible governments alike. Two decades of disastrous experience with the GASB pension accounting demand that we examine the rules themselves. We categorize the problems as legal, chronological, actuarial, mathematical, financial, economical, political, and philosophical. We examine them in this order.

Legal: Governments will not be liquidated

Beginning in 1994, with Statements 25 and 27, the GASB rule changes about public pensions were made to mimic rules in the private sector. However, when applied in the public sector the rule changes make pensions more expensive than necessary.

Consider the issue of full funding. A fully-funded pension system can, at least in theory, pay off all its current debts with no further contributions from the sponsoring employer. This is vital in the private sector because at any time, a private corporation can go out of business, be liquidated and disappear. Full funding and custody by a third party is the only way to make sure a pension granted by such a business will be paid. A pension system in the private sector must be fully-funded in order for the promise of the pension to mean anything at all.

By contrast, a government will not disappear in the same way. To claim so is only to agree with, among others, GASB itself. In a 2006 paper called, "Why Governmental Accounting and Financial Reporting Is—And Should Be—Different," they defend the difference between governmental accounting standards and those appropriate for the private sector. Early on, the authors point out that the lack of a threat of liquidation is among the primary differences:

> "[M]ost governments do not operate in a competitive marketplace, face virtually no threat of liquidation, and do not have equity owners."[29]

A hundred years from now there will still be a New York City, even if its area has been reduced by rising sea level. It may have suffered a bankruptcy—maybe two or three—but bankruptcy is not liquidation. It may have been split into its five boroughs, or it may have been overtaken and merged with a rapidly growing Yonkers, or maybe even taken over by the state. Unlike the liquidation of a private company, each of those possible transitions, however absurd or unlikely, leaves a successor to assume the responsibilities of the previous government. Insurance against the city's disappearance is therefore a waste of money.[30]

Chronological: Present value masks the level of urgency

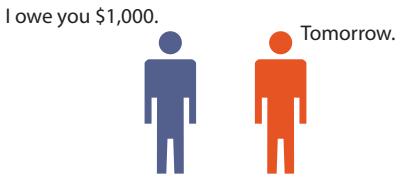
Pension accounting relies on a presentation of assets and liabilities in their "present value," the value today of a sum of money tomorrow. At a 5 percent annual discount rate, a present value of $100 today corresponds to a future value of $105 a year from now. The appropriate discount rate depends on your estimates of inflation and potential investment returns, so there is a degree of subjectivity in any present value calculation. Nonetheless, there is a time dependency of the value of money, so it makes no sense to compare 2016 assets with 2046 liabilities, except by computing the present value of the liabilities to compare to the current value of the assets.

Unfortunately, though the concept of present value is a way to translate future funding into the present day, the calculations made to describe the present value of a pension debt elide important issues surrounding a payment schedule, even beyond the issues of subjectivity. By definition, present value captures the monetary value of a future series of payments, but it fails to capture the urgency of those payments. By making all calculations in terms of present value, pension accounting rules imply an equal urgency to all debts, something that is obviously not the case. For a pension liability, the relevant payment schedule not only extends out decades into the future, but it also extends decades longer than the 30-year amortization periods required by GASB 27. The last payment owed by any pension system will not be made until the youngest current employee dies. If the youngest employee is in their 20s, this could be more than 60 or 70 years in the future. For systems that offer survivor benefits, it could be longer than that.

The Funding Ratio of Debt

What else matters?

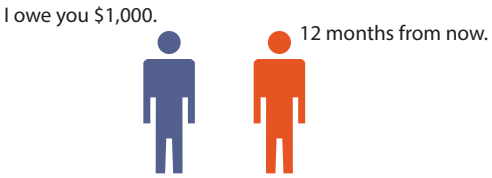
Funding crisis.



REVENUE SOURCE 1
$600 in savings

Only 60% funded

Funding is going to be okay.



REVENUE SOURCE 1
$11.76/week from savings

REVENUE SOURCE 2
$7.96/week from paychecks

Only 60% funded

Consideration of the payment schedule is important to the stress of a debt because two debts with the same present value can require dramatically different plans for payment. Imagine a debtor with assets of $600 and a debt of $1000, due tomorrow, and compare him to another debtor with the same $600 in assets, but who owes

The same present value and the same funding ratio can be a crisis or not, depending on variables that the present value of a debt does not capture. One of these persons is in serious trouble, and the other only mildly concerned, but both have debts with the same present value.

$19.72 per week for a year. Assuming a discount rate of 5 percent, these debts have precisely the same present value, and therefore precisely the same $400 unfunded liability. Yet one debtor is in much better shape than the other. The first debt could justifiably stimulate panic; the second is certainly worth more than a yawn, but much less than panic. Action is required, but the debtor has until week 32, over seven months away, to mull over action or to raise additional funds. The Illinois pension debt is $111 billion, but this need not be paid tomorrow, even if GASB 68 will have it appear on the same balance sheet as debts that are due tomorrow, or even past due. Accountants might claim these two debts are equivalent, but is this really the case?

As an incidental point, one can note that the traditional 30-year amortization schedule is only that: traditional. A pension system that dutifully follows such an amortization schedule will see its debts prepaid decades before they are actually due. Paying them in advance is not necessary to making payments, and yet it is the accepted wisdom. One searches in vain for any author presenting a reasoned justification for equating 30-year debt with immediate debt, or using a 30-year term to pay off a 60-year debt. These rules represent little more than blind acceptance of precedent.

Actuarial: Full funding is not required to pay all pension debts

The drive to full funding cannot be justified actuarially, either. Though the details depend on actuarial characteristics of the employee and retiree population, many, if not most, defined-benefit pension systems can operate forever at far less than full funding. A retired teacher in Chicago who passed away in 2014 after a long and happy retirement had every penny of her pension paid by a system far below full funding, and yet all her pension checks cleared. A system at 70 percent funding can likely pay all its obligations in a given year, and if at the end of that year it is at 70.1 percent, who is to say this cannot be repeated the following year if the actuarial facts on the ground do not change significantly? Social Security operated at what amounted to a few percentage points of full funding in its trust fund for two generations and only a very few pension plans are funded at levels so low.[31]

To put it more rigorously, the normal cost to a pension plan accumulated within a calendar year is the present value of the additional benefits accrued by all the employees in that year. If the contributions to the fund (employer and employee contributions, as well as investment income) are adequate to offset the normal cost and inflation, then the unfunded liability of a plan will not change from one year to the next.[32] If the unfunded liability does not change one year to the next, the fund can operate indefinitely with that same unfunded liability.

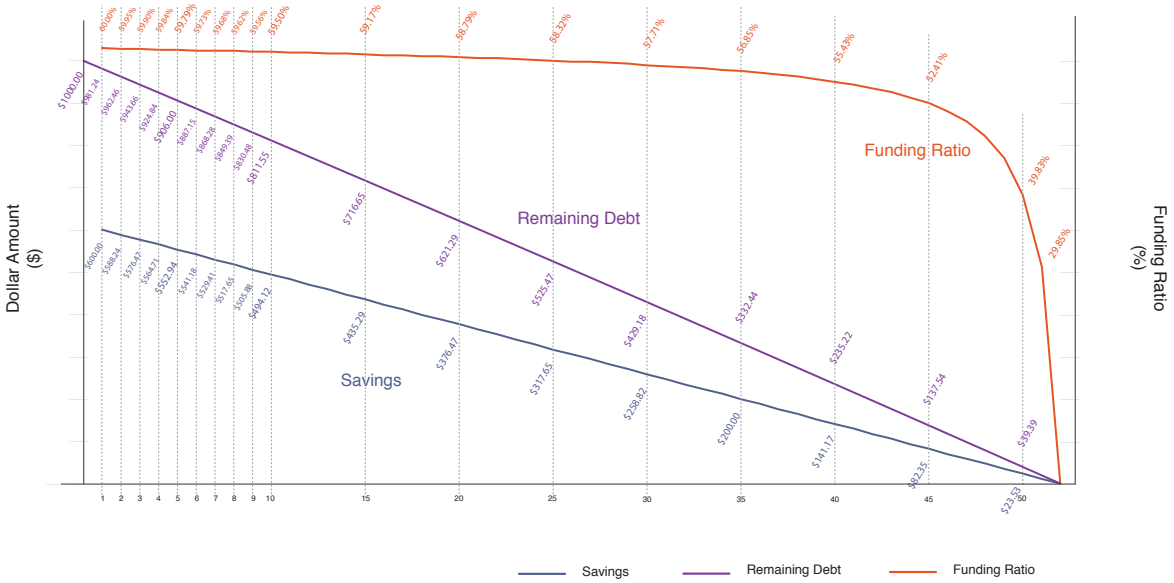
A pension fund must pay 100 percent of its debts. But it need not pay them a moment before they are actually due, and since a pension plan is constantly receiving new contributions, the fund itself need not be the only source of payments. As a result, even if all the debts are paid, at any one time, the fund itself may be at some level well below 100 percent funding.

Recall the example above. Perhaps I took a $1,000 loan from you, promising in return to pay you $19.72 per week for a year. If I have only $600 in the bank, then I have an unfunded liability of $400. If I also have some source of income of just $7.96 per week, I will be able to pay 100 percent of this debt, down to the penny, out of the combination of my income and my savings. Every step of the way, my funding ratio—the ratio of my assets to the present value of my remaining debt—will be 60 percent or less. (See figure on page 13.)

This is a toy example and tracks the debt to only a single party. A pension system might have debts owed to tens of thousands of members or more, all owed on their own schedule. The debt estimates are also subject to considerable uncertainty, since the demographic mix of employees and retirees changes over time, too. The principle, however, is the same. So long as there is another source of income, the ratio between the fund and the present value of the debt has little

Paying a Debt Over a Longer Time

Paying a debt with a limited funding rate



Amortizing a debt with both income and savings. The lower straight line is the savings balance at the beginning of the week, and the line above that is the value of the debt remaining. Both lines decline gently to zero as the savings are exhausted and the debt retired. Above them is the funding ratio, and you can see that at no time does the funding ratio go above 60 percent—in fact it declines each week—and yet 100% of the debt is paid. The table assumes an annual discount rate of 5%.

to do with how much of that debt is ultimately repaid. An active pension system has three sources of income: (1) the contributions from the employer, (2) from the employees, and (3) from the returns on investment. Belaboring a point of arithmetic like this seems a waste of time, but the implication that the funding ratio has some relevance to the full repayment of the pension debt is not only a staple of public pension criticism,[33] but is enshrined in official policy statements from bond-rating agencies, actuaries, and the National Association of State Retirement Administrators.[34]

A 2008 report issued by the Congressional Government Accountability Office (GAO) agreed with the assessment offered here:

> "Most public pension plans report having sufficient assets to pay for retiree benefits over the next several decades. Many experts and officials to whom we spoke consider a funded ratio of 80 percent to be sufficient for public plans for a couple of reasons. First, it is unlikely that public entities will go out of business or cease operations as can happen with private sector employers, and state and local governments can spread the costs of unfunded liabilities over a period of up to 30 years under current GASB standards."[35]

Mathematical: Financial reports deserve more precision

Another objection to GASB 68 has to do with precision. A pension plan's unfunded actuarial liability is a planning value, based on dozens of assumptions about market performance, population mortality, and the life choices of hundreds or thousands of employees. Comparisons of identically-calculated planning values like this are tremendously useful for identifying trends in funding progress or lack thereof. However, the accuracy of these numbers is contained in bounds much larger than is normal for other numbers found on financial statements, such as accounts payable or bonded indebtedness. Pension planning values are a guess about the future, useful primarily to compare to each other. Financial statements are a record of the past. Despite the statistical methods used to develop these estimates of future liabilities, actuarial and accounting precedent do not demand the explicit reporting of the error bounds, as one sees in other statistical estimates, such as polling data. Rendering these inherently inaccurate numbers as part of a government's statement of net assets, as demanded by GASB 68, dramatically reduces the accuracy of that statement's bottom line.

The issue is not the mere uncertainty of the numbers. Accountants use uncertain numbers in many of their calculations. The problem is that uncertainty is infectious. Adding a high-precision number to a low-precision number results in a low-precision number, so the result is low-precision financial reports.

Given the size of pension debts, adding them into the total can make the actual value of a government's net assets vary significantly from the stated value. According to its 2014 financial statements, the unfunded liability for Illinois pension funds is estimated at $111 billion, but the potential error in that estimate is as large as the absolute value of the state's revenue shortfall of $45 million. Depending on the specific fund, the assumed rate of return varies from 3 to 6.5 percent. These are conservative assumptions compared to many peer systems. A difference of only a single percentage point between these guesses and the reality of the next few decades will change the state's bottom line by over $20 billion.[36] It is not typical to think of a statement of net assets as potentially uncertain by more than 50 percent of the bottom line, but that is the new standard of accounting according to GASB 68.

Financial: Rate of return is for the longest term.

GASB 68 specifies that a pension system below a 100 percent funding ratio must use a "risk-free" rate of return as the discount rate for estimating its future liability. This liability is the number that must appear on a government's financial statements, alongside the more traditional components of its liabilities, like bonded indebtedness, and accounts payable.[37] The risk-free rate of return is what one can count on earning on investments with no risk. More or less, this would be a portfolio that is entirely invested in US Treasury bonds or the equivalent: no stocks, no municipal bonds, no private equity funds, no commercial paper, no hedge funds.

Statement 68 does not insist that a fund actually be invested solely in Treasury bonds, only that it use that rate to predict its future liabilities. A fund can continue to use whatever funding strategy its managers see fit to use. But the liabilities will be calculated using this lower rate of return, thus will appear much larger than if calculated with a higher rate. This is important because GASB 68 requires the entire unfunded debt to appear each year in the government's balance sheet. Before this statement, under the requirements of the earlier Statement 27, a government only had to acknowledge whether or not it had made the ARC, the appropriate annual payment, to the fund.

There is an important point that is often brought up here, that the discount rates commonly in use for pension funds around the country are too high, and the modern world of low interest rates and low investment returns is here to stay. If it is indeed impossible for a well-managed portfolio to average 7.5 percent returns over the next few decades, then 7.5 percent should not be used.

The debate about what will happen in investment markets over the next 50 years often seem unnecessarily heated. The debate is between people who correctly point out that these numbers have been achievable for decades and people who claim that things are different now. While it is true that many pension systems have been able to meet their marks over the long term, it is also true that we have suffered a decade of reduced investment returns, and the prospects for improvement are not obvious.

In truth, neither side of this debate has any better claim than the other about the future. Both sides are defensible, and a determination about who is right can only await the coming decades. It is certainly true that a system that assumes a low but achievable rate is more conservative than a system that relies on a standard that might or might not be reached. But these discussions frequently elide an important point: few such debates are about how to design a brand new pension system. Rather, debates about such issues are debates about how to manage the systems we have already. Were one to consider establishing a new pension system, certainly choosing a low rate of return will be a good idea. It will make the system more expensive to run, but it will be more secure, too.

But what will the effect be on an existing system to dramatically lower the discount rate? This is not a small step to consider, as it will increase that overall liability considerably. A $10 billion future liability over 30 years at a discount rate of 7.5 percent will see that liability balloon to well over $15 billion with a 5 percent rate. Upon the adoption of GASB 68, the average funding ratio will decline around ten or fifteen percentage points as hundreds of billions of dollars of "new" liability is recognized under the new rules.[38]

Every cent of that new liability will appear on the governments' statement of net assets. For many leaders and critics of their governments, showing a huge debt on the bottom line will be too much red ink to contemplate with equanimity and political pressure to do away with these obligations will build further—with potentially destructive consequences. A rate too high risks underfunding which may lead to higher taxes in the future, but a rate too low risks political pressure which may lead to reduced or eliminated benefits in the future. Readers will differ about which is the more salient risk.

In other words, GASB 68 creates large disincentives for governments to use a lower rate at the same time it requires them to do so. This is a recipe for unnecessary political crises across the country. It is vital that government financial reports be clear about what a government's debts actually are, but it is also vital that these statements should not be misconstrued. For all the reasons outlined here, there is a substantial downside risk to acknowledging reductions in the assumed rate of return. If changes like these are to be made, they must be made slowly, as financial and political circumstances permit. These are systems meant to be run in perpetuity; most can afford to be patient.

One can see a cautionary tale in the woes of the US Postal Service and its retirement systems. The USPS is technically not bound by GASB accounting rules, but in late 2006, President Bush and the Republican Congress passed a law to force the system to estimate its retiree and health-care liabilities 75 years in advance. The requirements insist, that is, that the system account for the retirement expenses not only of postal workers not yet hired, but of those not yet born. Increasing the funding horizon so dramatically and suddenly is essentially the same kind of shock to the system that an abrupt increase in the discount rate would create. In the ensuing decade, the Postal Service has largely managed to fulfill its funding mandate. As of 2015, the USPS had over $335 billion saved, covering over 83 percent of the liabilities anticipated over 75 years, under very conservative assumptions about the discount rate and value of current assets.[39] But the price has been high, and the service incurred $51.7 billion in operating losses between 2007 and 2014 as a result. These losses have shorted new capital investment and service expansions and left the service open to persistent charges that it is an obsolete money-loser at the same time it was forced to put aside a breathtaking sum of money.

In a 2014 interview, the deputy director of the California State Teachers Retirement System (CalSTRS) pointed out his fund had averaged better than 7.5 percent returns for decades. Under the new rules, he said they must use a rate of about 4.5 percent, increasing the present value of their liabilities by more than 50 percent, but that the portfolio would go along, earning its 7.5 percent as before. In what way, he asked, do the new rules provide an accurate picture of that fund's condition?[40]

Economical: Comparisons to pension debt should be chosen properly

Consider again the Illinois pension plans' unfunded liability of $111 billion in 2015. This is a vast sum of money, especially for a state with an annual budget of only a bit more than half that amount. However, this debt took decades to accumulate and it will be decades before it must be paid off completely. Most, but not all, of the debt will be paid out over the next 50 years. Over that time period, using a very conservative 2 percent inflation estimate, the state's income tax collections alone will be in the neighborhood of $1.1 trillion and the total state budget will involve spending well over $4 trillion. Therefore, this supposedly colossal debt in reality constitutes about 2.5 percent of the state budget. Personnel costs are around a quarter of the Illinois budget, so this is roughly 10 percent of the payroll costs over that time period.[41]

Stepping a bit further back, the Illinois economy is much larger than the state budget, and over those same 50 years, can be expected to produce around $64 trillion.[42] That is, another way to look at this debt is that it is 0.17 percent of the state's gross product over the term during which it will be paid, a much less frightening number. These are not spurious comparisons; the state's economy and the revenue it receives are precisely the resources the state will use to pay this debt.

A roughly equivalent way to state this objection is that the GASB rules do not acknowledge as an asset the strength of the local economy and the ability of its taxpayers to pay in the future. Ensuring that the government can pay its obligations in the future is virtually the entire goal of the GASB accounting rules, but the rules are narrowly drawn so that only qualifying funds kept in trust are counted as a strength. Is it necessary to take such a narrow view of the ability to pay? Another vital difference between a government and a corporation is that a government has a claim on the potential future income of its citizens that no private corporation can make. Indeed, this works in both directions, since money withheld from the economy in the near term, say by raising taxes or cutting schools to make inflated payments to a pension fund, can reduce economic growth and thereby make pension payments more onerous in the future by reducing the size of that future economy.[43]

Political: Overfunding is a risk, too

A serious risk that does not get much attention at present is the overfunding of a pension plan. Such a risk may seem almost laughable given current circumstances, but it is a serious risk, worth serious concern, not least because it is the goal. The primary objective of pension funding policy choices from GASB to city hall is full funding and full funding is one good investment year away from overfunding. Indeed, full funding is arguably a synonym for overfunding.

The primary concern is that overfunding is a tangible waste of resources, money unnecessarily diverted from other priorities, but there are other potentially disturbing consequences. A pension system—especially a well-funded one—is not insured against the depredations of politicians, for whom the near-term cost of a pension gift or skipped payment is quite low, if not zero. The GAO report cited above puts it this way:

> [S]everal [experts] commented that it can be politically unwise for a plan to be overfunded; that is, to have a funded ratio over 100 percent. The contributions made to funds with "excess" assets can become a target for lawmakers with other priorities or for those wishing to increase retiree benefits.[44]

In other words, it is virtually a law of nature that an overfunded pension plan—or any plan over, say, 90 percent funded—will see retiree benefits increase or budgeted contributions decrease.[45] In the context of full funding, these changes will have little or no current cost. And as predictably as the sun rises, after the next investment downturn, it will be an underfunded pension plan again, but now with a government budgeting for lower payments and retirees accustomed to higher benefits. This will unavoidably cause a delay in raising payments to catch up.[46] This is precisely how events worked out for CalSTRS, the giant pension fund for California teachers. Fully-funded in 1998, its investment returns plummeted when the tech bubble popped in 2000–2001, but not before the state cut its payments into the system and increased some classes of benefits.[47] The system currently has a $73 billion unfunded liability and a 68 percent funding ratio, quite a fall from 1998.

CalSTRS was hardly alone in its experience. The Chicago Teachers Pension Fund was fully-funded in 1995, which was used to justify a ten-year "holiday," dramatically reducing payments into the fund. Even by 1999, the system was still full-funded. Along with this holiday came increased benefits and management expenses and those, combined with the two colossal incidents of financial market turmoil since then. As of 2014, the plan is 51.5 percent funded.[48] The pattern is reflected in national averages. Census Bureau data shows that 1997 was a high-water mark for employer contributions to public plans, many of whom cut contributions in the warm glow of full funding, but had to restore them by 2003.[49]

Under the GASB rules, a mayor who chooses to skip a pension payment or settle a labor dispute with an ill-considered increase in pension benefits might incur the displeasure of a rating agency in future years. That, in turn, might raise the cost of borrowing down the road: a problem for a future mayor. Furthermore, many cities currently have what are essentially junk bond ratings. For these cities, the ratings risk only barely rises to the level of a material concern, and these consequences are only potential, not certain. In other words, the cities most likely to skimp on their pension contributions are the least likely to be harmed by the consequences in the near term.

For CalSTRS, the Chicago schools, and so many others, reduction of the dollars flowing into the pension systems harmed the health of the funds, but in each of these cases the effect on the current budget of the sponsoring government was zero. In fact, to the extent that a skipped payment or a new police department contract relieves financial pressure on the city, the effects can be positive, in the short term. A good accounting system is supposed to provide an accurate picture of an organization's financial health and a useful guide to action. In these cases, the accounting system guides its users to destructive and inappropriate action.

We have already seen how the GASB rules insure against the liquidation of a city or state, a risk that does not exist. Here we see the rules simultaneously failing to insure against risks that public systems do face. In some cases, the rules even encourage those risks. The divergence between the risks insured and the risks actually faced is not merely ironic; it is a recipe for failure. The insured risks never materialize while the others always do, given enough time. In this case, failure means further increases in the cost of employee pensions, further ire directed at teachers, police officers, and other public employees, and more stress on the tottering finances of state and local governments.

Philosophical: A pension plan is a mutual, not individual, arrangement

The last, philosophical, objection to the GASB framework requires a look into the fundamental principles behind a pension plan.

It is typical to speak of pension plans as belonging to one of two varieties, defined benefit (DB) and defined contribution (DC). A "DB" plan is a modern name for a traditional pension plan while a DC plan is just another name for an employer-sponsored savings plan. These two categories of plan are frequently portrayed as distinguished by the level of risk incurred by the employee and the employer. The employee can be said to bear much more of the risk in a DC plan than for a traditional plan and vice versa. This is all too true, but portraying this as a question of which of two parties assumes the risk is inaccurate, because with a traditional plan there is essentially a third party to the equation: the body of plan members as a whole.

A traditional pension plan works because not all the people paying into the system will have a long and happy retirement. Baldly put, some of the members will die before enjoying all the benefits to which they are entitled. Those who do not will see their retirement financed by those unused contributions. The consequence of this reality is that it is very difficult to separate the value of one member's contribution from another. The value to each member is that they are all in the fund together, insuring each other.

By contrast, the principle behind the GASB accounting reforms is roughly that accountants ought to be able to match the marginal cost of each employee with the marginal contribution from that same employee. A DB plan is a collective entity, but the GASB accounting insists on looking at individuals. Quoting directly from Statement 68:

> "For defined benefit pensions, this Statement identifies the methods and assumptions that should be used to project benefit payments, discount projected benefit payments to their actuarial present value, and attribute that present value to periods of employee service."

In other words, the rules provide guidance for determining what fraction of the fund "belongs" to any individual employee, given in exchange for their work in some particular year. This is the root of the GASB insistence that current employee contributions should not be used to pay current retirees, and the insistence that all plans should be 100 percent funded. Only a fully-funded plan can have all of the employee-years allocated to employee shares of the fund assets. There is no clarity to the accounting otherwise.

A pension plan is a mutual insurance arrangement. The collective financial strength of the body of members is greater than the sum of the parts. In a pension plan, every member has an equivalent claim on every dollar coming into the system. There is no sense in which a dollar of contribution "belongs" to this or that member, and systems do not define a priority among members. The employer and the fund itself are a source of strength, but so are all the other members: three sources of security. If one is weak, the others are still available. A plan with a 30 percent funding ratio obviously is less secure than a plan at 80 percent, but under the right demographic conditions, it can still run indefinitely because of the employer and all the other plan members. By insisting the only important thing is accounting for individual contributions and expenses, the GASB rules seek to erase this source of security from consideration. Worse, the rules lead to decisions that undermine the third source of security, by making full or partial plan closures seem like a sensible idea.

When critics complain that "generational equity" demands that one age cohort must not subsidize another, they are demanding less security than pension plans were invented to provide.

One age cohort does provide security for another and the same security will be provided to them in turn, as well as those after them. This is how these plans were designed. But this kind of equity is not an absolute good. Presumably if generational equity were valued above all other considerations, then teacher salaries would only be financed with debt, so the children who reap the benefit would eventually pay the expense. Perhaps it is best to describe this as a different kind of generational equity, where one generation receives the benefits it enjoyed in the past. The kindness we extend to our children is different from the kindness we expect from them, but that does not excuse them from extending the same kindness to their children in turn.

The invention of mutual insurance redefined life among the working and middle classes in the nineteenth and early twentieth centuries. Insurance was not the only such innovation, but was part of a movement toward the democratization of finance that included life insurance, disability insurance, and unemployment insurance, not to mention savings banks, savings bonds, and mutual funds. The push to old-age insurance was a part of a political movement that began years before 1911, when the pioneering director D. W. Griffith produced a film called "What Shall We Do with Our Old?" The answer the movie proposed was to establish old-age insurance to provide pensions to alleviate poverty among the elderly. It took decades of effort, but eventually politicians and industry responded. Private pension systems were established, and between 1914 and 1934, when Social Security was established, twenty-eight states had established experiments with old-age pension plans for their poorer residents.[50]

The plot of Griffith's film was a tragedy, meant to illustrate a preventable irony: old-age penury in a wealthy society. The refinement of mutual insurance into "old-age insurance,"—which subsequently became known as pension plans—has all but erased this kind of poverty in developed countries. It seems an odd claim that "clarity" in accounting should be deemed more important than that.

OTHER POST-EMPLOYMENT BENEFITS CRISIS

The issue of "Other Post-Employment Benefits" (OPEB), mainly health care expenses for retirees, is technically somewhat different than the issue of pension plans. However, the two are often spoken of together, and so the OPEB crisis deserves at least a brief treatment here. GASB Statements 43 and 45 did for OPEB accounting roughly what Statements 25 and 27 did for pensions, with three important differences.

The first difference is that many fewer governments have established a fund for OPEB benefits at all. When GASB made its Statements 25 and 27, most pension systems were already funded on an actuarial basis. The statements had the effect of creating a welcome degree of uniformity, in addition to the less salutary effects described here. In 2004, however, when the OPEB statements were issued, few governments were pre-funding those expenses, so the effect of the new rules was to demand that such funds be created. The unfunded liability for all government-sponsored OPEB plans in the country is estimated to be over $2 trillion.[51]

The second difference between OPEB funding and pension funding is that typically there are no contributions to an OPEB fund by current employees. OPEB benefits are usually incurred as an expense by the employer alone, removing a significant contributor to the security of those funds.

The third problem is the most significant, that the rate of health care inflation is—at present—greater than the rate of inflation for pretty much everything else.[52] To make OPEB liability calculations, actuaries typically project the current rate of health care cost inflation forward 50 years or more. Projecting even a small percentage growth forward over half a century produces a tremendous sum, and the resulting liabilities are indeed enormous.

However, the current rate of health care inflation is not sustainable over the next 50 years by any component of society, not just pension plans. It is not just city and county pension funds that will suffer if our nation fails to control these costs, the federal government, hospitals, non-profits, schools, corporations, and individuals will all be transformed in appalling ways by these escalating costs.[53]

Fifty years from now, if health-care inflation is not lowered significantly, all fifty states will have been bankrupted by Medicaid costs. The federal government will only have avoided a similar fate by printing enough money to devastate the value of Treasury bonds, causing worldwide financial instability. American corporations will pay more in health care to their employees than in salary. As the rest of the economy withers, health care costs will grow until they are much more than a quarter of GDP.

The GASB accountants made a valid point about costs when they issued Statements 43 and 45. Indeed this nightmare scenario could happen. The issue is hardly the cost of funding these benefits. The issue is the escalating cost of health care for retirees and everyone else, retarded only slightly by the Affordable Care Act. The GASB rules in practice are akin to planning for an asteroid collision with earth by putting away enough money to pay the electric bill when it happens. The asteroid collision could happen, but the electric bill will hardly be anyone's first concern. The irony is amusing, but if saving for the electric bill actually interferes with taking protective action for the rest of society, then it is actually destructive.

COMMON "SOLUTIONS" THAT SELDOM SOLVE ANYTHING

The accounting rules for pensions as described by GASB are not merely poor indicators of a system's financial health and stability, they are an equally poor guide to remedial action. What appear, under these rules, to be sensible strategies for improving a pension's funding are, when judged by practical experience, highly risky and speculative ventures that routinely create catastrophe where none was necessary.

Obviously any plan with a funding shortfall can simply modify the contributions to the plan or the benefits paid from it, and these solutions are legion: raise the retirement age, lower the benefit, raise the employer contribution, raise the employee contribution. Some plans have opted to create tiers of employees, to economize by providing lower benefits for newer hires. These are all part of the standard austerity playbook, and adequately covered in many texts on the subject.[54]

But a few other options exist and are widely used, often to the detriment of the policy makers who choose them. These include (1) pension obligation bonds, (2) closing a pension plan, and (3) shifting employees to a defined contribution plan. Each incurs risks at least partly obscured by the accounting rules. A partially funded pension plan that uses one of these strategies takes on this hidden risk and therefore may face a higher risk of funding shortfalls in the future than a similar plan that forgoes them.

Pension obligation bonds: Investing on the margin

The liability of a pension is a debt owed to the future retired members of a pension plan. The fund assets are the wherewithal currently on hand to pay that debt, so the unfunded portion of that liability can be thought of as an unpaid debt compounding at an interest rate equal to the discount rate used to forecast liabilities.

According to this analogy, the sooner it is paid off, the better. If it is possible for a government to borrow at a lower rate than that discount rate—and for most governments it is—an obvious strategy is to borrow at the low rate in order to pay back the debt compounding at the higher rate. This is a pension obligation bond (POB).

However, another way to look at it is that a government that issues a POB is borrowing on the margin, and betting the returns achieved will be better than the interest to be paid. This is high-risk investing. Oakland, California, issued the first such bond, in the 1980s, and Congress quickly acted to say that such bonds are not tax-exempt. Pension bonds are thus market rate bonds. Since the governments that issue them tend to be the troubled governments, whose bond ratings are likely not AAA, the margin between the interest rate paid and the pension fund discount rate tends to be small.[55]

Imagine a pension fund with $2 billion in assets, with an unfunded liability of a billion more, and thus a funding ratio of 67 percent. Assume all goes very well, and the government borrows that extra billion at 5 percent over 30 years, while managing to invest it all at an average of 7.5 percent over the whole term. This sounds good, but another way to look at this is that the fund actually earns 7.5 percent on two-thirds of the fund and only the difference between that number and the POB interest rate, or 2.5 percent, on one-third of the fund. This creates an effective rate of return of 5.83 percent, much less than the assumed rate. In other words, the cost to the government of this pension plan is the same as a fully-funded plan that is not achieving its investment targets. This is hardly a knock-out argument in favor of such a bond.

Furthermore, the bond capital must be repaid, not just the interest. If the POB payments capture the bulk of what might have amortized the unfunded liability, and the government and employee contributions just barely cover the normal costs of plan members, the plan may not be in appreciably better shape at the end of the POB term than it was at the outset. That is, after a 30-year POB has been paid back, the funding ratio for our example fund might not improve at all—even if everything goes as well as can reasonably be expected. This will seem especially harsh since, for the previous 30 years, policy makers will have regarded the plan as fully-funded. The temptation simply to roll over the debt by issuing another such bond will be very strong.

Of course it is very seldom that everything goes as well as can be expected. In reality, financial market returns are volatile, and POB margins are small, so the success of such a bond depends heavily on the market timing. In a survey of several thousand POBs, researchers with the Center for State and Government Excellence found that, as of 2014, of the POBs issued in the previous 20 years, most were only barely in positive territory, and a few had lost quite a lot of money. Timing and luck appear to be the determinants, awkward components out of which to build sensible policy.[56] The Government Finance Officers of America is fairly blunt in their assessment (part of their collection of "best practice" documents): "The GFOA recommends that state and local governments do not issue POBs..."[57]

Even more unfortunately, the fixed borrowing costs of any bond market transaction encourage governments planning to take such bets to take large ones. Detroit, Michigan, sold $1.44 billion in POBs in 2005—and lost $2.8 billion on the deal.[58] Stockton, California, sold $125 million in POBs in 2007, and had to go into bankruptcy when the gamble failed. The fund was left in worse shape than before the bond was issued, and the city owed the POB capital to its bondholders.[59]

Closing a plan: Riskier than you might think

Many political leaders, faced with an apparently colossal pension debt have concluded that closing their government's pension system is the only feasible alternative. The obvious problem with such a strategy is that it is not an answer to the question of funding the debt. That is, closing the plan because the debt is too large does not excuse a government from paying that debt, even if it does keep the debt from growing further.

Closing a pension plan has important risks that may not rise to the awareness of a policy maker looking at the raw numbers. These risks are again masked by the accounting rules. The first is simply that one of the real strengths of a pension system, essentially unacknowledged by the GASB rules, is the flow of money into the system from its members and their employers. Depending on the financial market conditions, this flow is usually a comparable size to the investment returns or larger. The consistency of this contribution makes it at least as important in providing security to the system as investment earnings, if not more so. Removing this source of strength leaves a pension plan to rely on the financial markets alone, not a well-known source of security.

Beyond these concerns, there are investment constraints imposed by closing a plan. One of the advantages of managing investments in perpetuity is that managers are permitted to take the long view in everything. Earning the necessary 7.5 percent may be feasible when all investments can be long ones. A system without that long horizon has a serious disadvantage when it comes to the array of investments open to it. As a pension plan winds down, more and more of its fund must be kept in relatively liquid short-term investments. These seldom earn the higher returns of the longer-term assets. Therefore, the greater the proportion of the fund that must be kept in short-term investments, the less feasible it is to achieve the typical investment return targets. A 2011 analysis done by the California Public Employees' Retirement System (CalPERS) showed that closing that system would give up $150–200 billion in investment returns over the course of winding the system down, about half the size of the overall fund.[60]

Sometimes, closing a plan is done with a POB. This is subject to all the risks of a POB, with the added risk of ending the employee payments into the fund. If a POB is a tightrope act, only successful when interest rate and market conditions are just right, closing a plan with a POB is a tightrope act without the net. The city of Woonsocket, Rhode Island, issued a $90 million POB to close its police and fire employee pension plan in 2002. A dozen years later, as reported in their 2014 financial report, after some poor investment years, the plan has assets of only $46.4 million, still has an unfunded liability of $42.2 million, only a single employee still paying into the system ($5,000 each year, compared with $8 million in expenses), and the city has a $79.4 million left of the bond debt to repay.[61]

Defined contribution pension plans: Not really a pension, or a solution

Another common strategy to addressing an unfunded pension liability is to transition to a DC plan, or a hybrid pension plan with DB and DC components to it. The claim here is that a government can shed some of its risk by moving employees to that kind of pension. Certainly the inflation risk and the investment risk are with the employee under a DC plan. But converting from DB to DC is approximately the same thing as partially closing a plan, so the risks of closing a plan are not avoided, merely reduced. Beyond those risks, there are others in this approach.

To begin with, the administrative costs tend to be higher for a DC plan than for a DB plan. In the CalPERS analysis cited above, the authors point out that fees for their DB plan amount to about a quarter-percent per year, while a typical DC plan charges between one and two percent per year.[62] Thus the investment returns must be that much higher to achieve the same standard of living for the retiree.

Large plans, the size of a state or big city, can usually negotiate substantially lower fees for a DC plan,[63] sometimes only a few basis points higher than a comparable DB plan if the options for the employees are few and simple, but other investment constraints still offer cause for concern. Because the investments are being made on behalf of an individual with a finite lifetime rather than a perpetual group, more must be saved, and the returns will be lower.

Isolated from a group, an individual employee must save for his or her maximum expected life expectancy, not merely for the average, as with a DB plan. Paradoxically, this not only increases the risk of underfunding a retirement, but also increases the risk of overfunding as well. That is, it is harder to reach the appropriate target, so fewer people will succeed, and the appropriate target is too high, so only the luckiest of the successful–the ones who both save enough and live their maximum life expectancy–will not be wasting money. Everyone else who has successfully saved enough for their maximum life expectancy will have had earnings they were unable to enjoy while alive. Their heirs may not consider this a problem, but from the perspective of efficiency, it is a very real waste of resources. And these are only the lucky few; there will be substantial hardship among the many who have not saved enough.

The CalPERS analysis points out the other problem with investing for an individual, that whereas a traditional pension plan can be invested for a very long horizon, a DC plan must adjust its investments for the ages of its members. An older member needs a more conservative investment mix than a younger member–and a more liquid mix once the member retires–and this reduces the potential rate of return, increasing the risk that an individual's savings will be inadequate to finance a comfortable retirement.

In addition, many pension plans incorporate some form of disability or survivor's benefits. A government that must honor that commitment to its pension plan members will see an additional cost to provide the same benefit to its DC members.

Claims that money can be saved by converting from a pension plan to a DC savings plan usually rest on the argument that the costs of running a pension plan are underestimated, rather than on a denial of these transition costs.[64] Other common arguments are that the assumed rate of return for a pension plan is unrealistic, or that the lowered investment returns from the shortened time horizon are inconsequential, if not negligible.[65] As we have seen, the existing accounting rules tend to exaggerate the costs of a pension plan. It is that very exaggeration on which these arguments rely to make their point about the relative savings of closing a pension plan, or the advantage of DC plans.

Another argument is frequently made, that private industry has "moved away" from the unsustainable costs of pension plans. This is a tendentious reading of recent history. Private defined-benefit pension plans across the country have been closed not because they were unsustainable, but because the executives of the corporations sponsoring them wanted to use that capital for different purposes and existing law provided a way for them to do so.[66] The 1980s saw a blossoming of the private equity industry, devoted to buying companies and repurposing their financial assets to the benefit of the new owners. The decade also saw repeated raids on the pension funds of the newly purchased companies, raids that continue to this day. More recently, congressional changes to the law governing pensions and the Pension Benefit Guaranty Corporation provided incentives for corporate managers to end these plans and turn the responsibility for their retirees over to the government, a managerial moral hazard. But even as of 2000, when the most recent wave of disassembly began, most remaining corporate pension funds were fully-funded or even overfunded. The stock market losses of 2000–2001 cut into that margin, but not significantly. It was the desire to repurpose that capital, combined with the federal guarantee and new rulings about bankruptcy, that made ending these plans desirable, and thus inevitable.[67]

A report from the National Institute on Retirement Security listed several reasons for the decline of DB pension plans, including decreasing union presence in the work force, the legal and regulatory environment, and changes in corporate priorities, and added: "It is interesting to note that each of these reasons has little to do with the underlying economics of maintaining DB pension plans."[68]

In truth, given that a DC plan does not envision a level of retirement income at all, it is perhaps arguably not even appropriate to label it a "pension" plan at all. In fact, the phrase was not used

until the 1970s. Until then, it would have been called a savings plan, or a stock purchase plan, if it had a name at all. In many ways, the rebranding of a simple savings plan as a "pension" plan is a triumph of marketing in service of a massive reappropriation of pension plan assets.

POTENTIAL SOLUTIONS: DIFFERENT ACCOUNTING FOR DIFFERENT QUESTIONS

If this article were merely a plea for less demanding pension funding requirements, that would be a difficult argument to sustain in the face of the facts. But though a central argument here is that 100 percent funding is hardly necessary to keep pension checks from bouncing, it is equally troubling that the abstract nature of pension funds also permits governments to ignore already existing funding requirements. The impacts on the current budget are always years away, making it easy to shave a little in the current year, which becomes a little more the following year, more the next, and so on. In a similar fashion, accounting rules that make clear a system's strengths include the ongoing stream of payments from future employees would be preferable to rules that envision a system that might close tomorrow. Finding a form of funding and accounting practice that encourages adequate funding is a valuable goal—and is precisely the goal sought by the GASB in their 2012 revision—but one where the current rules fall short due to the many problems outlined here.

Alternate accounting rules are possible. Unfunded liabilities and funding ratios are not the only kind of planning values available. For example, instead of estimating a funding ratio, the Social Security trustees predict the year in which that fund will run out of money, given current trends. If, each year, the date advances, the system is in good shape. If it does not, there is cause for concern. This is simply another way to do the accounting for a pension plan, with advantages and disadvantages compared to the traditional method. It is worse at allocating the cost to any individual plan member, but it is arguably much better at respecting the fundamental philosophy of aggregated security behind a traditional pension plan.[69]

A pay-as-you-go system is also a different method of accounting. Like the depletion-year method it has positive and negative features. It does a poor job of predicting how much money ought to be put aside for future years, the original reason this practice was largely abandoned. However, a pay-as-you-go system will provide instantaneous budgetary feedback to pension changes. That is, changes enacted to make a system more generous will be immediately reflected in increased costs to the current budget (rather than the pension system budget) and a reduction in payments to the system will immediately be reflected in pension checks bouncing. These are the sorts of effects that, in a practical sense, constrain the actions of politicians, unlike vague promises that a bond rating might be threatened, or that a big tax increase will be necessary a decade or two hence.

A hybrid system, combining the better aspects of pay-as-you-go and the GASB-approved systems would appear to be possible, perhaps by developing a formula that would keep a certain amount of the annual retiree payments for a pension system as part of the sponsoring government's annual budget. This must be done not simply by recalculating the necessary contribution to the pension fund, but by arranging government finances so the pension checks to retirees will not clear unless such an appropriation is made. The linkage between policy and outcome must be immediate and clear in order to have an effect on policy. Under the status quo, the linkage is neither.

For example, a government could seek to "monetize" the stream of payments made by its employees into the pension fund as a way to make clear that these payments are an important asset of the fund. A revenue bond backed by the premiums paid into the fund in future years could be bought annually from the government in exchange for a portion of the benefits paid to retirees in the current year. The bond itself would be an asset of the pension fund, offsetting its liability.

The bond could be rated or have some small piece of it sold to another party to establish its value. Under such an arrangement, the government, rather than the pension fund, would be responsible for issuing benefit checks. The fund would pay the government for the next year's bond, retaining enough to maintain or increase its funding level. The government would use the funds received to pay retirees, along with its employer share premiums. The debt to the retirees is of the government, while the pension plan incurs a debt to that government.

Under such a system, an abrupt change in benefits would have a direct impact on the government's current budget. Were a mayor to promise large pension increases to the firefighters, part of the first installment would be paid directly from the city budget the very next year. Similarly, a reduction in premium payments would affect the value of the bonds, with an impact on the balance sheet of both the pension fund and whatever other agency might hold them. If the state owned some of the bonds in its cash pool, a governor who cut pension payments would see the value of the bonds drop, creating a loss to the state's own balance, as well as that of the pension fund. Unlike the current system, the consequences of these decisions would be immediate.

Such an accounting change could not remove political considerations from pension management. Whatever forces exist to keep the compensation of government employees from being cut–applied by organized labor or the job market–would remain, and a change in accounting could hardly do away with political pressure to hold down or cut budgets. But the consequences of policy decisions would be clearer and sooner, with much less opportunity for decision makers to shrug away responsibility for highly contingent events years hence.

There is much detail to be added here, and this suggestion is only one possibility. It is merely a sketch of a possible system, intended to demonstrate that there are other ways to configure the relationship between pension fund, retirees, employees, and the government that may create clearer and better feedback and therefore better incentives for the various parties.

ARGUMENTS AGAINST

The movement of GASB in recent years, through Statements 67 and 68, have been in precisely the opposite direction to the arguments presented here. The arguments against the perspective presented here are thus well known, and worth airing and addressing.

Facing facts: On not kicking the can down the road

> "The problems that we have right now were caused in the largest part by delaying payments, kicking the can down the road," said Sen. Daniel Biss, D-Evanston, a key pension negotiator. "It's very dangerous. It should only be done if it's paired with a very specific, clear plan for how all the payments will be made and the pension systems will be brought back to full payment."[70]

In debates over pension funding, proponents of austerity, in favor of paying off the unfunded liability as quickly as possible will often accuse their opponents of simply wanting to "kick the can down the road" and avoid facing the hard truths. The Chicago Tribune article quoted above even uses the phrase in a sub-head. The argument made is that these problems must be addressed eventually so therefore a hard-nosed look at the facts will support addressing them now. People who suggest otherwise are irresponsible procrastinators who will eventually be forced to face the facts.

The metaphor itself is interesting, because kicking the can down the road is only a problem if there comes a point at which one can kick that can no further. As we saw above, under the right conditions, a pension system can pay benefits indefinitely at funding levels much lower than "full" funding. In other words, unless the combination of funding level and demographics creates a liquidity crisis, there is always room to "kick the can" further, and the metaphor misleads rather than enlightens. Obviously a system must be managed so as not to create a liquidity crisis, but this need not be done through 100 percent funding, as thousands of technically underfunded pension systems demonstrate each year.

It is true, however, that since the assumed rate of return in most systems is, at least in 2016, higher than the combination of inflation and economic growth, there is an advantage to putting money into the system sooner. One hundred dollars deposited now in an investment earning 7.5 percent interest will very likely be worth more ten years hence than one hundred dollars compounding at 3 percent inflation plus 2 percent economic growth. But the simple fact of this advantage does not then imply that all dollars not invested this way are wasted. Schools must be staffed and roads maintained; a government's many commitments, opportunities, and responsibilities must be weighed against one another. Furthermore, many government expenses, such as infrastructure, public health, and education, can usefully be considered to be investments. Some of them will pay off at rates higher than a pension fund's assumed rate of return. Even maintenance costs for some assets can be considered to be investments that pay off handsomely.[71] There are few governments where one expense can be allowed to trump all others.

Budgeting: Full funding reduces volatility

Another reason to value full funding is the consistency of employer payments. In a fully-funded system, when investment returns vary, the resulting variation in necessary premiums (from employees or employer) is usually small enough to be unimportant. Because the payments into the system are larger, a partially funded system will see correspondingly larger variation in the required premiums from the same investment variations. Volatility is an important concern in public finance. Because the budgeting process is cumbersome, dramatic changes in expenses tend to become controversial, no matter their relative size.

As true as this is, one way to amplify the volatility of a partially funded system is to amortize the unfunded liability on a fixed schedule. As the fund progresses down the road to amortization, the effects of variation in investment returns become ever more extreme.

A plan with $4 billion of liabilities, funded at only 50 percent, is probably assuming a return of about $150 million in investment income, if it uses a typical 7.5 percent rate. Assume that, in one year, contributions to the system include $175 million devoted to paying down the unfunded liability on year five of a 30-year course. If investment returns fall $150 million short that year, so there is no investment income, there will be little progress on the unfunded liability, as most of the contributions must go to fund the pension checks. As a result, the unfunded liability will remain the same, and there will be one less year in which to amortize the same debt, by raising the required payment for the next year. (See table on page 27.)

After such a shortfall, in order to stay on schedule to pay off the debt, the following year's amortization payment will have to be $188 million, an increase of 9 percent. This may not seem tragic, but if the government had been on year 20 of the same amortization schedule, suffering the same loss would cause a 12 percent payment increase the next year. Were it on year 25, with only 5 years to go before achieving full funding, the required increase in the amortization payment would be 21 percent. On year 26, the increase would be 26 percent, ramping up dramatically as the remaining time in the schedule declines. This is true for a pension fund that has stayed exactly on track on its amortization schedule until then. For a pension fund that has fallen behind at all, the increases at the end will be much larger, as the amortization of losses accumulates. Large increases will frequently be deemed politically infeasible and so many amortizations will not be completed successfully.

Schedule years remaining	Unfunded Liability	Assumed Income	Actual Income	Amortization Payment	Amortization Next Year	% Increase
25	$1.67 billion	$150 million	$0 million	$175 million	$188 million	7.6%
15	$1.00 billion	$150 million	$0 million	$175 million	$192 million	9.7%
10	$667 million	$150 million	$0 million	$175 million	$197 million	12%
5	$333 million	$150 million	$0 million	$175 million	$212 million	21%
4	$267 million	$150 million	$0 million	$175 million	$219 million	26%

The effect of failing to meet investment targets becomes more significant as a pension fund advances on its amortization schedule.

In the author's experience, amortization schedules developed under these rules tend to seem reasonable only at the outset. A few years in, after being exposed to the vagaries of real-world investments, they usually call for utterly unmanageable increases in amortization payments at the very end of the schedule, often just in the last three or four years. This is an unremarkable outcome of the arithmetic of the reductions in the amortization period. The only remarkable part about it is when the government in question decides to "buckle down" and try harder rather than simply relax and restart the amortization schedule.

In other words, full funding is a worthy goal to prevent volatility in payments. But if, in order to prevent a problem one has to endure it—in an amplified form—sensible people might be led to question the therapy.

A better way to amortize shortfalls due to volatility is to amortize them on the same time scale as the system amortization. If a shortfall occurs in year 20 of a 30-year schedule, that shortfall is amortized over 30 years rather than the remaining 10. This will unavoidably make the amortization much longer, but 30 years is an arbitrary choice for a system being managed in perpetuity. Some pension systems (e.g. the State of Rhode Island employee pension system) have adopted this method of accounting, but it is far from universal.

Accounting clarity: What questions can you answer?

Accounting systems are designed to make clearly available the answers to the important questions one might ask about some enterprise. A business, for example, must be able to track whether it is earning a profit. Accrual accounting was invented to make clear whether a business is solvent, or even profitable. It does not, however, give a very good picture of the cash position for a business. This is less important for a company that might make its routine purchases with a line of credit, for example, so accrual accounting is used in most businesses.

An entirely different set of considerations obtain for a typical household, which is usually more interested in simply not experiencing a liquidity crisis. For a household, cash accounting is more useful in a day-to-day sense, even if it does not give a perfect picture of a household's solvency. The appropriate accounting system depends heavily on the important questions, and the context in which they are asked.

For a pension system, the question of solvency in perpetuity is the important question. It is vital to know whether a system will receive the assets it needs to pay the liabilities it owes, out into the indefinite future. By making the standards uniform, and closing some reporting loopholes, GASB 68 makes answering important questions about the funding situation of a particular plan simpler and easier.

Unfortunately, the questions this system answers are not the most pertinent. That is, the GASB rules do a good job of answering, "How much money will this plan need to pay off its debts if it is closed tomorrow?" But most plans are not going to be closed tomorrow, so this is usually not very useful information. A more useful question might be along the lines of "How are we doing?" or "How much volatility will we suffer as we go along paying our bills?" The GASB rules provide those answers only in an oblique manner, for those willing to read past the headline numbers, just as a household's solvency must be ascertained by looking beyond their bank balance.

In other words, the clarity provided by the GASB rules comes at the expense of making the situation seem much more dire than necessary. By ignoring, if not actually undermining, the value of the collective strength of a pension plan, the rules do a deep disservice to those who have contributed loyally to the plans for decades. The new rules will also require governments to add a deficit of billions of dollars to their governments' bottom line, something few political leaders have the will to ignore.

As of this writing, governments across the country have only just begun to comply with the new rules, and as yet, no one really knows whether the bond-rating agencies will overreact or ignore the colossal new debts that are appearing on municipal bottom lines. Either way, it is not at all certain that clarity has been added to the situation.

CONCLUSION

Current trends are not promising for addressing the concerns described in this paper. Detroit's immolation, for example, has produced only a limited backlash. Citizens are certainly angry about what has happened, but with so many possible targets for ire—the auto makers' abandonment of the city, the corruption of its leaders, the exploitation by Wall Street—technical debates about accounting rules are unlikely to rise to the top of the list.

Certainly GASB itself sees no problem. Indeed, recent developments there, such as the adoption of Statements 67 and 68, have all been in the direction of making the situation somewhat worse. The people who made these changes happen are still at GASB. Their rhetoric forces them to continue to wave this flag and to defend it vigorously. Reform and the concomitant relief will not come from within GASB. Similarly, it is difficult to expect reform to come from Congress, or any other legislature. They are temperamentally unsuited to do anything but delegate technical problems such as this.

In a theoretical sense, it is quite possible for governments simply to ignore the GASB rules. They are, after all, only guidelines to accepted accounting practice. However, in a practical sense they are woven into a straitjacket that government must wear. Bond ratings and practical politics conspire to force governments to comply with these rules and only the strongest leaders are likely to resist. Unions are somewhat conflicted. Though the threat of bankruptcy is beginning to awaken some to the dangers of the policies they have abetted, if not pursued, their concerns have largely been about the benefit side of the equation.

The accounting rules have been a convenient club to wield against public employees and their unions for those who would do so. The "obvious" poor state of the pension funds makes it easy to claim that the public has been duped into obligations it cannot afford, and this has been very useful in weakening the political position of these unions. In turn, many union leaders have participated in their own weakening by making unnecessary demands for full funding. In the author's personal experience, labor leaders frequently perceive concern about the cost of a pension plan to be equivalent to arguing to weaken the guarantee of their benefits. A suggestion of ways to make managing pension funds less expensive is therefore an attack on benefits.

Full funding is a valuable goal, but so is reducing poverty, keeping roads paved, educating children, fighting crime, and so on. Few government goals can be considered to trump all others, and diversion of taxes into pension savings is a choice not to fund something else.

In the end, accounting rules should be a guide to action, not a guide to perfection. It is one thing to know how far from the promised land of full funding a system is, but it is a different and more valuable thing to understand how to get there. When those rules guide us to action that makes things worse, leaving us farther from the target than before, what are we to think of the rules?

Ultimately the best argument against the current rules is that following these rules is not necessary to keep the checks from bouncing. "Full" funding of any pension system requires spending more money than necessary to meet the government's obligations. Is that not the very definition of waste? The remaining question is whether our nation will drive thousands of municipalities into bankruptcy, deprive millions of public employees of pension benefits they have earned, and discredit one of the great financial advances of the last century—all in order to preserve this waste. To date, the answer is not comforting.

ENDNOTES

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19. Source: US Census Bureau State and Local Government Employee Retirement System Survey, as compiled by Jun Peng. State and Local Pension Fund Management. Boca Raton, FL: CRC Press, 2009.

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22. These are Pension Obligation Bonds, discussed on page 22.

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30. For more about the difference between private and public entities, and the differences in risk, see Peng, State and Local Pension Fund Management, section 4.2.

31. Author's calculations from (Social Security Trustees. Trustee's Report. 6/23/15. Social Security Administration. 2014. URL: **http://www.ssa.gov/oact/STATS/table4a1.html**) The system was unable to sustain this low level of funding because of demographic changes. That is, the actuarial facts on the ground did change, as the baby boom worked its way through the system.

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34. Keith Brainard and Paul Zorn. The 80-percent threshold: Its source as a healthy or minimum funding level for public pension plans. Tech. rep. 6/28/15. Lexington, KY: National Association of State Retirement Administators (NASRA), Jan. 2012. URL: **http://www.nasra.org/files/Topical%20Reports/Funding%20Policies/80_percent_funding_threshold.pdf**.

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37. See GASB 68 paragraphs 27 and 28.

38 .Alicia H. Munnell et al. The Funding of State and Local Pensions: 2012-2016. Tech. rep. SLP 32. 6/17/15. Center for Retirement Research at Boston College, July 2013. URL: **http://crr.bc.edu/briefs/the-funding-of-state- and- local- pensions- 2012- 2016/**. Note that the new requirements do not apply to systems considered to be fully-funded, and some systems already use a low discount rate. Both causes will tend to lower the effect on the "average" system, even while the effect on any individual system may be cataclysmic.

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40. Interview with Ed Derman, deputy CEO of CalSTRS, June 6, 2014.

41. Further calculations from 2014 Illinois financial statements.

42. Author estimates from Bureau of Economic Analysis data.

43. This kind of argument is a staple of anti-tax argumentation, and it is remarkable how seldom it is deployed in this context.

44. Bovbjerg, State and Local Government Pension Plans: Current Structure and Funded Status.

45. The risk of a fully-funded, or overfunded, pension plan is not only the political risk of increased benefits and reduced contributions, but also that policy makers will perceive an opportunity to close the plan entirely. According to the GASB framework, this is a rational choice for a fully-funded plan. There may be a political cost to such a decision, but the accounting says there would be no financial cost. In reality, closing a plan substantially increases the risk to the taxpayers, and experience shows that few such decisions have turned out to be good ones. (See page 22.)

46. Peng, State and Local Pension Fund Management, chapter 6.

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50. Dora L. Costa. The Evolution of Retirement: An American Economic History, 1880-1990. 6/26/15. University of Chicago Press, 1998. URL: **http://www.nber.org/books/cost98-1**.

51. Girard Miller. "Strategies To Consider As OPEB Costs Escalate." In: Government Finance Review (Feb. 2011). 6/28/15, pp. 28–35. URL: **http://www.gfoa.org/sites/default/files/GFR_FEB_11_28.pdf**.

52. Michael Ashton. TIPS, the Triple Duration, and the OPEB Liability: Hedging Medical Care Inflation in OPEB Plans. Tech. rep. 6/28/15. Society of Actuaries, May 2011. URL: **http://ssrn.com/abstract=1838545**.

53. Tom Sgouros. "The Manufactured OPEB Crisis." In: RIFuture (Nov. 2013). 6/26/15. URL: **http://www.rifuture.org/the-manufactured-opeb-crisis.html**.

54. For example: Peng, State and Local Pension Fund Management; Winklevoss, Pension Mathematics with Numerical Illustrations.

55. Alicia H. Munnell, Jean-Pierre Aubry, and Mark Cafarelli. An Update on Pension Obligation Bonds. Tech. rep. 6/20/15. Washington, DC: Center for State and Local Government Excellence, July 2014. URL: **http://slge.org/publications/an-update-on-pension-obligation-bonds**.

56. Ibid.

57. Government Finance Officers of America, Advisory, Pension Obligation Bonds, 6/26/16, **http://www.gfoa.org/pension-obligation-bonds**. The advisory goes on to list five very good reasons to avoid POBs:

The invested proceeds might fail to earn more than the interest rate.

POBs commonly have a complex structure with derivatives embedded in them that introduce counterparty risk and credit risk.

POBs are taxable debt, which usually counts against a government's overall debt burden for the ratings agencies.

The principal (re)payments may be missing, or structured over a longer term than the amortization period.

POBs are a red flag to ratings agencies, who generally take them as a sign of other trouble, potentially undisclosed.

58. Though this may have been mostly to do with the city's ill-fated attempts to hedge the floating interest rate of the POBs it issued by swapping with banks for fixed-rate debt payments. See Farmer, "Detroit's Pension Is Actually Well-Funded, So What's All the Fuss?."

59. Walsh, "How Plan to Help City Pay Pensions Backfired."

60. CalPERS. The Impact of Closing the Defined Benefit Plan at CalPERS. 6/21/15. California Public Employees' Retirement System (CalPERS). Mar. 2011. URL: **http://www.calpers.ca.gov/eip-docs/closing-impact.pdf**.

61. The plan has almost 60% of its assets in cash and fixed-income investments, so it takes a remarkable investment year for its assets to earn the 7.5% it needs to match its assumptions. In 2014, however, its assets did earn 8.28% gross (not counting investment fees). See the 2014 Woonsocket annual financial report at **http://www.ci.woonsocket.ri.us/FINancial%20Report%206-30-2014.pdf** (6/25/16), pp.58-65. The annual contributions of the single remaining employee were noted in the 2013 report (**http://www.municipalfinance.ri.gov/documents/data/audits/2013/Woonsocket_2013.pdf**). See also Sandy

Seoane, "Despite concessions, Woonsocket's pension is forecast to run dry." Valley Breeze, December 2, 2015. 6/26/16, URL: **http://www.valleybreeze.com/2015-12-02/woonsocket-north-smithfield/despite-concessions-woonsocket-s-pension-forecast-run-dry**

62. CalPERS, The Impact of Closing the Defined Benefit Plan at CalPERS.

63. Deloitte Consulting. Inside the Structure of Defined Contribution/401(k) Plan Fees, 2013: A study assessing the mechanics of the "all-in" fee. Tech. rep. 9/29/15. Washington, DC: Investment Company Institute, Aug. 2014. URL: **http://www.ici.org/pdf/rpt_14_dc_401k_fee_study.pdf**.

64. See, for example, Andrew G. Biggs, Josh McGee, and Michael Podgursky. Transition cost not a bar to pension reform. 6/21/15. Jan. 2014. URL: **http://www.aei.org/publication/transition-cost-not-a-bar-to-pension-reform/**

65. Lance Christensen, Truong Bui, and Leonard Gilroy. Addressing Common Objections to Shifting from Defined-Benefit Pensions to Defined-Contribution Retirement Plans. 6/21/15. June 2014. URL: **http://reason.org/news/show/pension-reform-defined-contribution**.

66. Fran Hawthorne. Pension Dumping: The Reasons, The Wreckage, The Stakes for Wall Street. New York: Bloomberg, 2008.

67. Ellen Schultz. Retirement Heist: How Companies Plunder and Profit from the Nest Eggs of American Workers. Portfolio/Penguin, 2011.

68. Ilana Boivie. Who Killed the Private Sector DB Plan? Issue Brief. 6/12/15. Washington, DC: National Institute on Retirement Security, Mar. 2011. URL: **http://www.nirsonline.org/index.php?option=com_content&task=view&id=607&Itemid=49**.

69. In truth, there is no reason a system using GASB standards cannot also provide a depletion date estimate as well, beyond the fact that the GASB rules provide no guidance for calculating it and that ratings agencies and bond buyers are not looking for it.

70. Hal Dardick and Monique Garcia. "Emanuel's pension plan: Relief on payments, casino to pay for it." In: Chicago Tribune (May 2015). 6/21/15. URL: **http://www.chicagotribune.com/news/ct-chicago-pension-payment-law-0527-20150526-story.html**.

71. See, for example, Wei Lin Koo and Tracy Van Hoy, of Jones Lang Lasalle, a large Chicago real estate firm, who developed estimates for the return on investment for preventive maintenance of various real estate assets such as HVAC equipment. Their estimates are that simple maintenance expenses can be construed as investments whose return is over 500%: Determining the Economic Value of Preventive Maintenance, 6/24/16 **http://www.pmmi.org/files/ms/certified/newsletters/preventivemaintenance.pdf**

APPENDIX

Table 1: Earnings from State and Local Pension Funds

Year	Total Payments	Employee Payments	Employer Payments	Investment Earnings
1942	119	65	54	36
1950	539	260	278	70
1960	1,819	802	1,017	398
1970	7,388	2,788	4,600	2,460
1975	13,604	4,488	9,116	5,294
1985	36,878	9,479	27,399	34,852
1986	39,185	10,586	28,599	48,965
1990	46,431	13,853	32,578	64,907

Table 2: Amortizing a debt with both income and savings. The first column is the savings balance at the beginning of the week, and the last column is the present value of the debt remaining after that week's payments. At no time does the funding ratio go above 60%—in fact it declines each week—and yet 100% of the debt is paid. The table assumes an annual discount rate of 5%.

Week	Savings	Payment from Savings	Payment from Other	Total Payment	Remaining Debt	Funding Ratio
0					$999.76	60.01%
1	$600.00	$11.76	$7.96	$19.72	981.00	59.96%
2	588.24	11.76	7.96	19.72	962.22	59.91%
3	576.48	11.76	7.96	19.72	943.43	59.86%
4	564.72	11.76	7.96	19.72	924.61	59.75%
5	552.96	11.76	7.96	19.72	905.78	59.69%
6	541.20	11.76	7.96	19.72	886.93	59.69%
7	529.44	11.76	7.96	19.72	868.07	59.64%
8	517.68	11.76	7.96	19.72	849.18	59.58%
9	505.92	11.76	7.96	19.72	830.28	59.52%
10	494.16	11.76	7.96	19.72	811.36	59.46%
15	435.36	11.76	7.96	19.72	716.48	59.12%
20	376.56	11.76	7.96	19.72	621.14	58.73%
25	317.76	11.76	7.96	19.72	525.34	58.25%
30	258.96	11.76	7.96	19.72	429.08	57.61%
35	200.16	11.76	7.96	19.72	332.36	55.69%
40	141.36	11.76	7.96	19.72	235.15	55.11%
45	82.56	11.76	7.96	19.72	137.51	51.49%
50	23.76	11.76	7.96	19.72	39.38	30.47%
51	12.00	11.76	7.96	19.72	19.70	1.22%
52	0.26	11.74	7.96	19.70	0.0	0.00%

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