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December 3, 2010

State and Local Pension Funding Deficits: A Primer

The financial health of state and local pension funds has been transformed from a yawn-inducing topic to a frightening one in a few short years. By some measurements, the shortfall across the nation adds up to over $3 trillion or more than two years' worth of state and local tax revenues. In a few states, such as California and Illinois, pension funding has become a major political controversy. This primer focuses on the following key questions:

- What is the problem?
- How big is it?
- How binding is the legal obligation?
- Why do we care about the problem?
- What caused it?
- How can we solve it?

This primer does not address the somewhat similar issue of retiree health care, since it differs considerably from pensions both in its legal status and in the level of predictability of future payments, among other things. To the extent that states are underfunded on that score, as many are, it will doubtless make it still harder to solve the pension problems.

What is the pension funding problem?

States and localities, like most private sector companies, defer a significant portion of their employees' compensation in order to help ensure adequate income in retirement. The great bulk of the deferrals in the public sector are offered through "defined benefit" pension plans. This is the traditional form of pension in which monthly payments are made to the retiree for as long as he or she lives and generally for the lives of surviving spouses as well, at a reduced amount. (Monthly checks from Social Security represent another example of a defined benefit payment in retirement.) For their part, employers make contributions over the working lives of the employees which, along with the very substantial investment income earned on the funds, are used to pay the eventual pension claims. (Employees may also be called on for contributions, as is particularly common in state and local plans.) Employers generally have some flexibility to time their contributions, since the funds are not needed for many years in the future. States and localities have even more flexibility than private companies, which are governed by federal laws designed to ensure that adequate funding is maintained.

Defined benefit plans have many advantages over wages as a form of compensation[1]. They protect employees from the risk of outliving their savings or suffering from poor investment performance and they also force people to save for retirement even if that is not their natural impulse. In addition, they gain from the very substantial tax advantage that employees are not taxed until they begin receiving the benefits, allowing the initial contributions to build up tax-deferred. Typical state and local plans, unlike private sector ones, generally also provide some protection against future inflation, although this is often capped at a 2 or 3 percent annual growth in benefits.

Unfortunately, many of the positives for employees have a corresponding disadvantage for the employers. The longevity and investment risks are borne by the employers that promise the benefits. There are good arguments for doing it this way, since employers are usually in a better position to manage investments and the pooling together of longevity risk eliminates the idiosyncratic portion of the risk as some individuals live longer than expected and others live less. (It does not remove the risk that the *average* life lengthens by more than anticipated.) Nonetheless, the risks taken on by employers in a defined benefit plan are quite substantial and can cause major problems.

The recent financial crisis brought home the severity of the investment risks by very substantially increasing the gap between the value of the assets accumulated in the pension funds and the value of the pension promises which had already been made. This underfunding is the core of the pension problem.

How big is the problem?

Measurements of the aggregate size of the pension deficits at states and localities across the country range widely. Novy-Marx and Rauh (2010a) estimated that state plans alone were in deficit by $1.2-1.7 trillion as of June 2009, using the states' own accounting and actuarial assumptions[2]. The corresponding funding ratio – the value of the pension assets divided by the value of the future pension payments – was between 53% and 60%. Pew (2010) had found a reported deficit of $0.5 trillion for state plans as of one year earlier, but had noted the expectation that 2009 deficits would be substantially worse due to declines in the financial markets. Both studies excluded the large deficits that exist at municipal and other local pension plans.

However, many analysts believe that the reported figures are based on inappropriate measurement techniques which substantially understate the true size of the liabilities and therefore of the deficit, as discussed at length shortly. One suggested approach is to use a risk-free discount rate. Novy-Marx and Rauh (2010a) found a $2.4 trillion deficit for state plans on that basis compared to $1.2 trillion at the

[1] Some of these advantages are also true of defined contribution plans, which are another way of deferring compensation for public employees. However, this is not the focus of this paper, since such plans do not generate pension deficits, by definition.

[2] Novy-Marx and Rauh took reported numbers for the state plans as of the most recent reporting date and adjusted them to June 2009 figures, based on historic growth rates of liabilities and changes in asset values. The $1.2 trillion deficit measures the liability as the Accumulated Benefit Obligation. Most states use an Entry Age Normal method. This produced the $1.7 trillion figure when applied to all states.

state-chosen discount rates. Biggs (2010) used an options-pricing approach[3] that suggested a $3.0 trillion economic shortfall as of mid-2008, which would likely have increased by 2009.

On top of this, localities have their own pension deficit problems, which Novy-Marx and Rauh (2010b) estimate to be roughly a quarter trillion dollars on a reported basis and a bit more than half a trillion dollars on a risk-adjusted basis. Thus, the local problem is considerably smaller nationally, but it does add further difficulties for policymakers and taxpayers. In a few cities, such as New York City and Chicago, the per capita figures are sharply higher than the national average, rivaling or exceeding the per capita averages for the states in which they are located.

How can the estimates vary so much? There is disagreement on three critical dimensions. First, there are multiple methods of measuring the size in today's dollars of the estimated future pension payouts. The questions revolve principally around the right interest rate to use in discounting future payments back to an equivalent value in today's dollars. Second, there are different ways of divvying up the future payments between those related to prior service and those related to future service. This is important because the pension liability at any given time generally relates only to past service. Third, states and localities are allowed to show asset values that are based on multi-year averages of market prices, which can considerably slow the reaction of asset values to sharp moves such as occurred in the recent financial crisis.

As a related matter, there are differing views about what portion of the existing promises need to be pre-funded and how much can be left for taxpayers in the future. The "problem" can be viewed as smaller than the size of the pension deficit if one considers it appropriate to maintain investments with a value less than the current promises. Perhaps more accurately, one could view this as splitting the problem between a portion that should be tackled in the near-term and a longer-term portion that is similar to maintaining a certain level of permanent debt. Choosing not to fund a portion of the deficit does have an economic cost. The implicit debt represented by the deficit leaves an overhang of interest accruals similar to the need to pay interest on the explicit debt represented by government bonds.

Measuring the cost of the promises in today's dollars

A dollar today is worth more than the promise of a dollar a year from now, even if you are sure the promise will be kept. A dollar today could be invested and would therefore be worth more in a year. Alternatively, a dollar today could allow you to avoid borrowing a dollar from someone else, on which you would have to pay interest. If the promise is less than certain of being kept, then receiving the money up-front becomes even more valuable in comparison to the promise. Economists and other experts dealing with long-term promises use a "present value" approach to reckoning the value in today's dollars of future payments. This involves estimating the future payments and then reducing the payments in each year by a discount factor based on: (1) the number of years from now until the

[3] Biggs used a Black-Scholes model to estimate the price the financial markets would have charged for taking over the states' effective guarantee that the pension plan assets would be sufficient to make all the relevant pension payments.

payment and (2) the chosen interest rate, known as a "discount rate". For example, at a 5% discount rate, a payment one year from now would be multiplied by 0.95 (one minus the .05 discount rate) and a payment two years from now by roughly 0.90 (the previous year's discount factor multiplied by one minus the .05 discount rate).

The discount rate is absolutely crucial to measuring the cost in today's dollars, since the pension payments are spread over so many years, with the average payment typically occurring decades into the future[4]. The compound effect of a discount rate being applied over so many years means that, for example, one dollar received 20 years from now would be worth 46 cents if discounted at a 4% rate or 21 cents at an 8% rate.

Unfortunately, there is a great divide between economists and the traditional views of actuaries about the right discount rate. (Actuaries are professional statisticians who specialize in making the technical calculations necessary for insurers and pension funds. Their figures are then used by accountants and pension fund managers in reporting the current funding status of the state and local pension funds.)

Traditionally, actuaries used the expected return on a pension fund's investments as the discount rate, which makes some intuitive sense. The future pension payments will be met out of today's investment assets plus earnings on those assets; if we knew the earnings would match expectations then the fund would only need investments today equal to the discounted value of the pension payments using that rate. Private sector actuarial and accounting rules have abandoned this approach because of concerns described below. However, the Government Accounting Standards Board (GASB), which recommends reporting rules for government entities, has retained this traditional approach, although it is currently considering some modifications that still preserve the core of the methodology[5].

Virtually all economists, many actuaries, and the author, take issue with this approach to choosing a discount rate, an approach inconsistent with standard practice in finance, economics, and accounting for private sector firms. As Novy-Marx and Rauh (2010a) put it "[d]iscounting liabilities at an expected rate of return on assets in the plan runs counter to the entire logic of financial economics". The key problem can be expressed in two different ways. Conceptually, a liability such as a promise to pay future pension

[4] The average "duration" of the plans studied by Novy-Marx and Rauh (2010a) was about 13 years. Duration is a mathematical calculation that essentially determines the average maturity of a stream of future payments, using a net present value approach. Because it reduces the value of future payments using the discounting method described above, it produces a lower figure than if one simply determined the year in which half the cumulative payments would have been made.

[5] In particular, they are considering retaining the current approach for the portion of the liability that would be covered by existing assets but using a municipal bond rate for the unfunded portion, since it is essentially dependent on the creditworthiness of the state or locality which backs the pension promise. This change would have relatively little effect on most pension funds, but would make a major difference for those with large levels of underfunding. It should be noted that there is some uncertainty about how to calculate what portion of the liability is to be considered "unfunded."

benefits should be discounted based on the uncertainty of the liability[6], not based on the characteristic of the assets set aside to meet the liability. Owing $100,000 on a five-year bank loan is an equally firm liability regardless of how one chooses to invest the proceeds for the five years. On the other hand, owing $100,000 to your family may be a more negotiable debt which perhaps should not be discounted with as low an interest rate, since your family may be willing to write down the debt without forcing you into bankruptcy. As this pair of examples implies, the large majority of liabilities in the world are firmly committed ones that require a low discount rate to reflect their near certainty of required payment.

It is important to note that a higher discount rate would be warranted if a state or locality could legally and practically choose to let a pension plan it sponsored default on its pension obligations. In general, however, state and local governments are legally committed to support these pension payments and therefore pension liabilities should have a discount rate no higher than the interest rate the market requires on municipal bonds[7] to compensate for the risk of default on general obligations of these entities. In fact, these pension payouts are in a privileged position in many states that make them virtually risk-free, implying a considerably lower discount rate. There is considerable discussion later in the primer on the degree of legal commitment to pension obligations.

In addition to the conceptual problems with using *asset* composition to determine the right discount rate for a *liability*, such an approach encourages funding levels that leave future taxpayers with large exposures to overly optimistic return expectations or sub-par investment performance. For example, most states and localities report expected annual returns on their portfolios fairly tightly clustered around 8%. Many observers consider this an unreasonably high expectation. Even if it is a reasonable expectation, it leaves states and localities exposed to decades like the last one in which returns are much lower.

Even worse, this approach can create perverse incentives stemming from effectively treating uncertain future investment returns as certain. Since financial markets generally pay higher expected returns for investments with greater risk, pension funds can increase their expected returns and raise their discount rates by simply accepting more risk. In turn, this would allow lower contributions from the taxpayers since the accounting standard would show that pensions were adequately funded with a lower level of investment assets, due to the higher discount rate used for future pension payments. Behaviorally, this is similar to deciding to save less for your children's college educations because you are going to invest in riskier assets that are likely to have higher returns. It works out great if the higher returns materialize, but exposes you to considerable risk that they may not.

The failure to adjust for risk would be less pernicious if taxpayers and policymakers had symmetric reactions to variations in the actual future pension deficits. Unfortunately, pension deficits are closely correlated with the overall economy, principally because of the high level of investments in the stock

[6] Brown and Wilcox (2009) sum up the economists' viewpoint as follows: "[f]inance theory is unambiguous that the discount rate used to value future pension obligations should reflect the riskiness of the liabilities."

[7] Note that "municipal bonds" is a term used by the market for both state and local bonds and does not refer solely to bonds offered by localities.

market. Thus, pension deficits turn out to be worst when the economy is in bad shape, such as today, making it particularly hard for taxpayers to absorb the cost of the required additional pension contributions. If they had been luckier and both the economy and the markets had done well, they would face lower than expected pension contributions at a time when this savings would not matter so much. In this respect, risk-taking in pension funds is the opposite of hedging – it is more like gambling the grocery money. Winning would be nice, but losing would be very painful.

Thus, there is a wide range of discount rates that could be applied to the future pension payments, depending on your theoretical viewpoint. Under current actuarial/accounting rules for government entities, most states and localities have chosen discount rates around 8%, based on the future returns they expect on their particular investment portfolios. (These portfolios tend to be heavily weighted towards US common stocks, with significant holdings of bonds, real estate, and "alternative investment vehicles" such as hedge funds or private equity funds.)

In contrast, economists support the use of discount rates that reflect the high probability that the pension liabilities will have to be paid off. Economists generally use Treasury bond rates as the "risk free" interest rate, and some have applied this to state and local pensions, but there are also good arguments for using somewhat higher rates. Some economists use the rate that states and localities pay on their general obligation bonds in cases where they believe the pension obligations are of equivalent legal stature to other obligations. However, a lower rate, closer to Treasuries, should be used in cases where state constitutional guarantees or other legal protections make pension obligations a higher priority than general obligations. Whatever bond rate is chosen, it ideally should be adjusted to reflect differences in tax treatment, liquidity, and inflation protection between Treasury bonds, municipal bonds, and pension payments. Each of these affects the interest rate on an instrument in ways that do not reflect the credit risk element that one needs to determine the appropriate discount rate.

In practice, the proposed discount rates range from roughly 3% for average Treasury rates today to 5-6% for tax-adjusted municipal bond rates to roughly 8% for expected return measures. Using a low-risk discount rate very substantially increases the pension liability compared to using an 8% return measure, in some cases resulting in a doubling of the reported deficit. It is worth noting that tax-adjusted municipal bond rates were significantly closer to 8% in June of 2009, the point in time Novy-Marx and Rauh measured pension deficits, as a result of the financial crisis. This is why their results did not show a large difference between the deficit using reported discount rates and the deficit using tax-adjusted municipal bond rates. Rerunning the figures today would likely show considerably greater liabilities.

Allocating the cost between past and future service

Complicating the calculation further, there is an issue as to what portion of the promises ought to be reflected as a liability at the current time. Future pension payments are affected both by actions that have already occurred, such as the years of service an employee has performed to date, and future events, such as the impact of future service and future wage increases. At one extreme, the "accumulated benefit obligation" (ABO) measures the value of those payments that have been accumulated to date, assuming no increase in future wage levels. At the other end of the spectrum, the

"projected benefit obligation" (PBO) calculates future pension payments based on assumptions about expected future service and wage increases and then spreads those costs evenly over the years of service of the employee. That is, if the total expected payments were worth $1,000,000 in today's dollars and an employee has served 40% of their total expected service, then the PBO would be $400,000. The key difference with the ABO is that future wage increases are built into the PBO, but not the ABO, and therefore the PBO will virtually always be somewhat higher. This difference is less important in low-inflation periods such as recent decades, but still noticeable.

The large majority of states use an actuarial method called "Entry Age Normal" which spreads the cost over the full period of service of each employee in a way that attempts to keep the cost fixed each year as a percentage of the employee's salary. Novy-Marx and Rauh (2010a) found that this resulted in a liability figure roughly 15% higher than the ABO for the state plans they studied and not too different from the PBO. Most of the remaining states use a "Projected Unit Cost" method that approximates the PBO.

In sum, it does matter what method is used to allocate the cost over the service of the employees, but differences in discount rates usually have substantially more impact.

Smoothing of asset values

Actuarial and accounting rules allow state and local pension plans to "smooth" asset values over time by using averages of market prices over multi-year periods for their investments, rather than using only the most recent market prices. Thus, the collapse of equity prices during the recent financial crisis would show up over time in the reported asset values, as would the sharp, partial recovery in stock prices starting in the spring of 2009.

Aggregate liability estimates for all states and localities

Table 1 shows some summary statistics from various studies on the size of the state and local pension deficits. Three points stand out. First, all the figures confirm that states and localities face a significant problem with pension deficits. Even half a trillion dollars is close to being a half year's tax revenue. Second, the deficit looks a lot worse as of June 2009 than it did as of June 2008, thanks to the financial crisis. The next figures to be reported by the states are likely to show deficits between those two levels, although this may be counter-balanced for the economic calculations by the drop in prevailing interest rates and therefore discount rates based on Treasuries or municipal bonds. Third, the use of a discount rate based on Treasury bond yields produces dramatically higher deficit figures, as does an options pricing approach which also treats the payments as essentially risk-free[8]. Risk-free calculations show roughly one to two trillion dollars more in liabilities and deficits than using an 8% discount rate.

[8] Biggs (2010) uses an approach to valuing the deficit which calculates how much the market would charge to guarantee the pension payments. He values this option using the standard options-pricing approach, the Black-Scholes model. Embedded within his calculations is an assumption that the pension payments must be made, which is consistent with the discount rate approaches that use risk-free rates.

Table 1: Pension Deficits Calculated by Various Recent Studies

	Valuation Date	State or Local	Discount Rate/Method	Assets ($ T)	Liabilities ($ T)	Deficit ($ T)
Novy-Marx and Rauh (2010a)	June 2009	State	As reported	$1.9	$3.1	**$1.2**
Same			Taxable muni	$1.9	$3.2	**$1.3**
Same			Treasury	$1.9	$4.4	**$2.5**
Same, using Entry Age Normal			Taxable muni	$1.9	$3.5	**$1.6**
Same, using Entry Age Normal			Treasury	$1.9	$5.3	**$3.4**
Pew (2010)	June 2008[1]	State	As reported	$2.3	$2.8	**$0.5**
Biggs (2010)	June 2008[1]	State	Options Pricing	$2.3	$5.3	**$3.0**
Munnell, et. al. (2010)	June 2008[1]	Both	8%, using PBO	$2.7	$3.4	**$0.7**
Same			5%, using PBO	$2.7	$4.9	**$2.2**

1. Figures were taken from those available in the first part of 2009 and therefore usually reflect fiscal year 2008 numbers. State fiscal years generally end in June.

Targeting a funding level

The key federal law governing pensions for the private sector, known as ERISA, attempts to guide companies towards "full funding," meaning that pension fund assets would be equal in value to the promises made to that date. Put another way, the target "funding ratio" is 100%, meaning that the value of the assets is 100% of the value of the promises. States and localities are not subject to federal law in this area and there are some who argue that a funding ratio below 100% is appropriate given the permanence of these governments and their need to balance multiple public policy objectives across generations. There are also practical arguments that shooting for 100% funding will sometimes mean that strong financial markets will boost the value of the assets to an extent that creates significant overfunding of existing promises. The concern is that such overfunding can create a political environment in which new pension promises are made simply because "the money is there," without full recognition of the volatility of financial markets that can take the overfunding away again.

On the other side of the argument, it is clear that holding assets worth less than the promises means that taxpayers will have to come up with additional money in the future for promises they have already made, related to employment service that has already been performed. This violates the general public policy theory that, absent good reason to the contrary, costs incurred in a given year should be funded in that year.

Even among those who believe it is reasonable to maintain a lower funding ratio, there is a strong, albeit not complete consensus, that states and localities should strive to ensure that their pension funds have a funding ratio not too far below 100%[9]. 80% seems to be a popular minimum target, although there is not a strong theoretical reason for that particular figure – it is the result of empirical analyses and judgment calls.

[9] In contrast to the consensus, Bohn (2010) creates a theoretical economic model of the pension funding decision for public entities and concludes that full funding would rarely be the optimal choice and little or no funding could be the best choice under certain circumstances.

How binding is the legal obligation?

There is a key question that affects the appropriate discount rate as well as the potential solutions to the pension problem: are these obligations legally binding? The answer would be quite clear if these were employees of private sector firms. ERISA makes most pension promises legally binding and even sets up the Pension Benefit Guaranty Corporation as an insurer to protect the bulk of the benefits in the event of a bankruptcy by the employer. However, ERISA does not apply to public sector employers.

State and local pension plans are subject to state contract law and any relevant provisions of their state constitutions. All states and localities are bound by the contracts they enter into, but this leaves open the question of whether a public employer has made a contractual commitment when offering a pension plan and what that exact commitment consists of. In many states, specific constitutional provisions for state and local pension benefits would override state contract law, in all cases giving them a binding force at least as great as under normal contract law and sometimes much greater. Brown and Wilcox (2009) note that in "a majority of states, public-sector pension obligations are protected by state constitutional provisions."

As a general matter, vested pension benefits are strong legal commitments in all states, with force at least equivalent to the obligation to pay bondholders. Benefits based on past service that are not yet vested will generally be protected, but not always. Future service may also be protected, depending on the state. In some states, employees are considered to have a right to continue earning pension benefits for the entirety of their careers in a manner at least as beneficial as the plan they were shown when they joined the employer.

At least three states have concluded that they have the right to reduce the inflation adjustment factor. Each has been sued to prevent such a change and the cases are working their way up through the court systems, likely to land in the lap of the highest state court in each case, given their importance.

In addition to legal theory, there is also some evidence from past practice when state and local governments run into serious financial problems. Brown and Wilcox (2009) discuss the New York City and Orange County financial crises, which led to a formal bankruptcy in the case of Orange County and a supervised financial restructuring for New York City. In both cases, despite relatively drastic actions taken in other areas, pension benefits were left untouched, including the accrual of additional benefits for new service.

Why do we care about the pension problem?

There are multiple reasons for policymakers, analysts, and the public to care about state and local pension deficits. These include:

Many state and local governments are going to have to make major changes to pension benefits, taxes, or services. Any of these actions would be painful, as described in the next section.

Some states and localities have particularly deep pension deficits that will warp civic priorities and local politics for years. Illinois and California are already among the states confronting these issues and many other states and localities may join them over time.

The cumulative effects of actions across the country could be a major drag on the national economy. It has already been observed that state budget cuts triggered by the recent recession have negated a significant portion of the stimulus being provided by federal government's spending and tax cuts. Pension problems could create an even worse, and longer lasting, drag in the future.

There is a significant chance of an eventual federal bailout, whether directly through tax revenue or indirectly through guaranteed and/or subsidized borrowings. Even in these relatively early stages of the problem, there are already calls for a federal bailout and these calls are likely to strengthen over time unless booming financial markets save the day.

What caused the problem?

This is a very complex question. There were multiple causes, their importance varied in different places, and analysts differ considerably in the weight they give the different causes. These causes included:

Excessive total compensation for state and local workers? This is a major area of disagreement among analysts. It is simply not clear whether state and local workers as a class are being paid too much or too little. Doubtless there are many examples of places or types of jobs where public sector workers are overpaid, as well as many others where they are underpaid. However, it is extremely difficult, except in quite isolated circumstances, to prove this, much less to develop aggregate numbers for the nation as a whole. The main problem is that pay comparisons only make sense if the jobs and workers on the public and private side are similar or differ in ways whose impact on fair compensation can be well-estimated.

For example, media reports often compare the average pay for public sector workers with those for private sector workers and find that the public sector pays better. However, further analysis shows that public sector workers tend to have substantially more education than those in the private sector, on average. Since, all else equal, better educated people earn more in our modern society, this clearly explains much of the difference. Similarly, age, gender, and other factors that have an impact on pay can be controlled for in serious studies. There are good reasons to use this analytical approach, but it does not capture any direct measures of output. The implicit assumption is that people with broadly similar characteristics would produce similar value.

However, there could be important differences that are not being captured, such as attitudes and life goals. For example, consider three stereotypes of public sector workers that, if true, could reasonably affect their output and therefore appropriate pay levels. Some people think public sector workers are less motivated than private sector workers, which should translate to lower output. Others think public sector workers are altruistic and drawn to jobs like teaching where they can do good. This could mean they would accept lower pay, but could also mean that "fair" pay would be higher, because they throw

themselves into their work in ways that are difficult to measure. Yet a third stereotype is that public sector workers are risk-averse. This might not affect output levels, but might indicate that they should be willing to accept lower pay in exchange for the greater job security of the public sector.

An alternative approach taken by some studies is to compare pay in jobs that are very similar between the public and private sectors. There are two problems. First, private and public sector jobs could differ a great deal in ways that are hard to capture, as could the type of people entering each sector. Second, large chunks of the public sector do not have good "comparables" in the private sector and we probably cannot safely assume that the differences found in the comparable areas necessarily hold for the other areas.

At the end of the day, we will probably never know for sure whether state and local workers are overpaid on average in terms of total compensation. This makes it hard to address the directly relevant question of whether these workers receive extravagant pensions. We know pensions are higher and more secure on average than in the private sector, but we do not know whether this is making up for lower salaries than workers could earn in the private sector.

Bad accounting. Most state and local pension funds either explicitly or implicitly target a minimum funding ratio, which means that the contributions depend significantly on the measured size of the pension liability. If one accepts the arguments of the economists, as the author does, then contribution decisions are being based on distorted numbers that substantially understate the true liability. In turn, contribution levels are key determinants of the benefit packages that employers are willing to offer in pay negotiations. Thus, unrealistically low estimates of the liability lead to both more generous benefit packages and lower funding, both of which encourage pension deficits.

Risky investments. Similarly, setting the discount rate based on the riskiness of the investment portfolio provides a direct incentive to take on more risks, as noted earlier. This helps explain the greater share of common stocks held by public pension funds compared to private sector funds. In addition, many of the key decision-makers may be overly influenced by a widely held misperception that stocks *always* perform better than bonds over long enough time horizons. It is true that stocks are expected to outperform, on average, and that this outperformance widens over time. However, there remains a significant probability of underperformance and the magnitude of that potential underperformance also gets bigger over time. Further, those periods of stock market weakness have a strong tendency to occur during bad economic times when states and localities can least afford to bear the burden of pension deficits, exactly as happened in the most recent crisis.

Short-term political horizons. Pension deficits can be easy for politicians to hide or ignore for their four or eight year term in office, which was likely a factor in the growth of the problem over many years. A major source of the deficits was the deliberate choice in some states to frequently skip even the minimum contributions that were calculated by conventional actuarial approaches. This would have been politically difficult to do in other fiscal areas that are less obscure. There is also the issue that

raising benefit levels in an election year can be a quite attractive political strategy, providing incentives to worsen the deficits.

Union power. Many of the voters in state and local elections are government workers, which tilts the political incentives towards providing higher benefits. The disproportionate impact of government workers is due in part to a lesser degree of interest among much of the public in these races. Government workers, in contrast, have a vested interest in paying attention and voting.

Public apathy. Pensions are quite technical issues and voters rarely get worked up over them, although this seems likely to change to some degree going forward unless and until the deficits drop substantially. Even when they do grow concerned, they are often quite unclear on what actions ought to be taken, which reduces the impact of these concerns on the actual decision-making.

How can we solve the problem?

There is no simple and easy solution to the problem of large pension deficits at the state and local level. There are some steps that can be taken to improve future decision-making, particularly moving to an accounting regime that better reflects the economic realities. However, even ceasing to dig the hole deeper is not necessarily easy, since the status quo of solid benefits and deceptively low apparent costs has been a happy false paradise for many politicians, employees, and union leaders.

Dealing with the accumulated deficit is harder still. Essentially, it requires either a division of the pain among employees/retirees, taxpayers, and other residents or a "bailout" by either federal government largesse or the luck of very favorable financial market conditions. The main possibilities are as follows:

Cut benefits or raise employee contributions for new workers. Although painful, this is a relatively easier step than most of the others, since it is clearly legal and does not violate any previous moral commitments. However, it may be quite difficult either for political reasons or because of labor market conditions. The latter point is a lesser issue in the immediate future, because potential new workers are plentiful compared to the quite small number of positions to be filled. Over time, however, it could become more important, depending, of course, on what the overall attractiveness of government work and its compensation truly is.

Cut benefits or raise employee contributions for new service by existing workers. This option also has the benefit of being forward-looking, which avoids some legal and moral difficulties. However, a number of states have constitutional or legal protections that make it quite difficult to change the benefit structure once an employee is hired. In addition, union power may be sufficient to stop such changes, although the balance of power has probably shifted in the direction of reducing taxpayer costs. In addition, worker recruitment and retention could be harmed, although it is hard to judge the impact of this in advance for the nation as a whole.

Cut benefits or raise employee contributions for past service by existing workers. This is generally exceedingly difficult from a legal perspective. Even general principles of contract law are likely to

eliminate this possibility unless it is part of a negotiated solution and it could require individual assents from each employee. Many states have constitutional protections that are significantly stronger than general contract law. Beyond the high legal barriers, there is also a major moral issue when governments renege on previous firm commitments.

Reduce inflation indexing for existing benefits. This is one variation of benefit cuts. It is listed separately because it is being tried in three states and may be easier legally than cutting benefit formulas in other ways. That said, all three states trying this are embroiled in lawsuits over their ability to do it.

Switch to a defined contribution (DC) approach. There are many who have suggested that states and localities switch to defined contribution plans, similar to the 401(k)'s available to so many private sector employees. DC plans cannot, by definition, be underfunded, since employees are only promised the returns accruing from their specific investment choices rather than a benefit based on a fixed formula involving years of service and salary levels. In itself, adding a DC plan would do nothing about pension deficits – it is the reduction or elimination of existing defined benefit plans that would cut those deficits. Therefore, adding a DC plan should be viewed as a carrot that can be offered in order to persuade current or future employees to accept changes to existing defined benefit plans. In general, unions and employees have resisted being forced to switch, so that many new DC plans are offered as a choice rather than an enforced substitution for a defined benefit plan. In any event, switching to a DC plan is unlikely to be a viable option to eliminate pension deficits related to *prior* years of service under defined benefit plans.

Raise taxes and increase contributions to the pension funds. Infusing more money into the pension funds would definitely reduce the deficits, but there are strong political and economic disadvantages to doing this. For one thing, there are clearly limits to the ability to raise taxes without encouraging people and businesses to move, thus reducing the local tax base.

Cut services and use the money for increased contributions. This has similar problems to raising taxes.

Get a federal bailout. This will increasingly be part of the debate unless something else reduces the size of the problem. However, it would be quite tricky to pull off. There are the political questions of how to persuade members of Congress from states with small pension deficits to support sending money to those with large deficits, especially since much of the deficit problem is self-inflicted. One way to do this is to effectively disguise the subsidy by providing a guarantee of new state debt raised for pension contributions. However, the expensive rescues of Fannie Mae and Freddie Mac may be too recent a reminder of the way in which guarantees, even implicit ones in those cases, can prove quite costly. If the federal government does step in, there will almost certainly be a quid pro quo of more realistic accounting rules and mandatory minimum funding standards.

Take more investment risk. If the Feds will not bail the funds out, perhaps the financial markets will. It is possible for a large rise in the stock market to substantially reduce the pension deficits, since roughly two-thirds of the assets are invested in stocks. However, it would take a very strong and sustained rise

from current levels, which are not cheap by many historical standards of valuation. Unfortunately, there is also the very real possibility that the next decade will see continued underperformance of stocks relative to historical standards. Increasing investment risk now would be very much like doubling one's bets at roulette. It makes it more likely that a lucky streak could restore one's fortune, but it also increases the chance of losing whatever remains of that fortune. As noted earlier, there is also the unfortunate strong tendency of stocks to do badly at precisely the time that states and localities are struggling, since stocks tend to do worst when the economy is in trouble and governments are suffering from decreased tax bases and higher expenses for unemployment benefits and other aid.

Conclusions

Deficits at state and local pension funds constitute a serious problem, with economic values of these deficits aggregating to approximately $3 trillion or more than 2 years worth of tax revenue. There are no easy answers either, unless very favorable stock markets intervene to save the day. However, the stock market would have to almost triple in a short period from today's level to eliminate the current pension deficits as measured using risk-free discount rates.

A great deal more research is needed, since this area was comparatively lightly studied until quite recently. Among the areas to be addressed further are:

Decision-making processes

- How are pension fund investments determined in practice?
- Who has the most influence on the end decision?
- What criteria influence those investment decisions?
- How are contribution levels determined in practice?
- What are the views of voters about public pensions?
- What are the views of politicians and government officials?

Accounting and actuarial issues

- What are the goals of the various users of pension reporting?
- How does GASB's structure influence its choices on actuarial standards?
- How have reporting standards influenced concrete choices by pension funds?

Public finance

- How big are the deficits compared to state and local resources?
- Which states will be hit the hardest?
- What are the limits on state and local ability to raise their contributions?
- To what extent are pension problems already factored into municipal bond markets?
- How will potential solutions be perceived by the markets?

Labor force questions

- How do public and private workforces differ?
- How do these differences affect their total compensation levels?
- What do public sector workers know about retirement plans?
- What are their preferences regarding retirement plans?
- What would they be most willing and least willing to give up?
- How do these characteristics differ between broad categories of employees?

Legal issues

- What are the key determinants of how binding pension claims are?
- How strong would pension claims likely be in a municipal bankruptcy or near-bankruptcy?
- How do these points differ across the key states?

Comparative research across representative pension plans

- Decision-making structures
- Benefit structures
- Funding levels and contribution decisions
- Investment decisions
- Deficit levels and plans to remedy them
- Actuarial choices
- Legal status of claims

Potential solutions to the deficit problems

- What has been done to date across the country and how have changes worked?
- What is the range of proposals?
- What other options are available?
- What is the right decision framework for evaluating proposals in this area?
- How can obstacles to good public policy be overcome?

Federal role

- How, if at all, have federal choices influenced state and local actions in this area?
- What are the options for the federal government to help?
- What would they cost?
- What are the likely national economic costs of if states are left on their own?
- How would the burden be shared if federal aid were offered?

We also need better transparency, uniformity, and timeliness in the information being provided by the pension funds. A few researchers have put in a great deal of work to reach conclusions that are relevant nationally, but they have been hampered by different and inadequate approaches to reporting. For

example, plans do not normally provide the expected cash outflows used by their actuaries, even though these are central to the main calculations.

Finally, the author is among those who believe it is critical to reform the accounting and actuarial rules so that state and local pension plans report liability levels and deficits that are consistent with economic reality, which will primarily require a move to discount rates that are based on the uncertainty of the liabilities rather than the expected return on the assets.

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