

2-1-2012

Public Pension Crisis and Investment Risk Taking: Underfunding, Fiscal Constraints, Public Accounting, and Policy Implications

Nancy Mohan
University of Dayton

Ting Zhang
University of Dayton

Policy Paper No. 2012-013

Follow this and additional works at: https://research.upjohn.org/up_policypapers



Part of the [Labor Economics Commons](#)

Citation

Mohan, Nancy and Ting Zhang. 2012. "Public Pension Crisis and Investment Risk Taking: Underfunding, Fiscal Constraints, Public Accounting, and Policy Implications." Policy Paper No. 2012-013. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. <https://doi.org/10.17848/pol2015-013>

This title is brought to you by the Upjohn Institute. For more information, please contact repository@upjohn.org.

Public Pension Crisis and Investment Risk Taking: Underfunding, Fiscal Constraints, Public Accounting, and Policy Implications

Nancy Mohan and Ting Zhang
University of Dayton
e-mail: nmohan1@udayton.edu
tzhang1@updaton.edu

February 1, 2012

Abstract

Public pension funds that cover retirement benefits for almost 20 million active or retired employees have been significantly underfunded. An important, though largely overlooked, issue related to pension underfunding is the excessive investment risk levels assumed by public plans. Our analysis suggests government accounting standards strongly affect public fund investment risk, as higher return assumptions (used to discount pension liabilities) are associated with higher investment risk. Public funds undertake more risk if they are underfunded and have lower investment returns in previous years, consistent with the risk transfer hypothesis. Furthermore, pension funds in states facing fiscal constraints allocate more assets to equity and have higher betas. There also appears to be a herding effect in that a change in CalPERS portfolio beta or equity allocation is mimicked by other pension funds. Solutions to excessive investment risk include use of more realistic discount rates such as a Treasury rate or a municipal bond yield to estimate liabilities and regulations or practices that reduce the ability of a plan to shift an underfunding burden to future generations.

Keywords: Public pension funds; Investment risk; State fiscal constraints; Risk transfer; Government accounting; Public union

PENSION CRISIS ISSUE: UNDERFUNDING AND EXCESSIVE RISK TAKING

State public pension plans, mostly defined benefit (DB) plans, cover pension benefits for 12.8 million active public employees and 5.9 million retirees and other annuitants.¹ However, by various funding measures, public pension plans have been significantly underfunded, particularly amid the recent financial crisis. By the end of fiscal year 2009, public pension plans had accumulated a total funding deficit of \$697 billion (measured by the difference between actuarial pension assets and liabilities), with an average actuarial funding ratio of 0.75. For most plans, the actuarial rate, the rate for discounting promised payments to retirees, is 8 percent. However, if future liabilities for these plans are discounted at lower rates to reflect the near certainty of payment, such as treasury or municipal bond rates (Novy-Marx and Rauh 2011), the funding ratio decreases to 0.43 or 0.59, respectively,

An important though largely overlooked issue related to pension underfunding is the (excessive) investment risk levels assumed by public pension plans. Plans allocating a higher percentage of funds to the stock market are more prone to market fluctuations. From 2001 to 2009, on average more than 56 percent of the pension assets were invested in the stock market. The average 2009 pension asset beta of 0.63, suggests that given another market drop of 35 percent, which was the drop experienced during the 2008 financial crisis, public plans would lose 22 percent of their total fund value.² Furthermore, underfunding and risk-taking behavior of public pension plans have become more imperative in light of state budget crises. This is because state governments are forced to use a greater portion of the budget for making pension contributions while reducing the expenditures on other programs and social welfare.

The severe funding gap prompts the question of whether the state governments will adopt riskier investment positions in the hope of raising returns and lowering the shortfall. Using data from several resources, we investigate the determinants of pension risk-taking policy during the period 2001 through 2009 after taking into consideration state government incentives, political pressure, fiscal constraints, labor union presence, and workforce features. Our measures of investment risk include the percentage of total plan assets invested in the equity markets and the pension asset beta (Jin, Merton, and Bodie 2006). In general, higher allocations to equity and higher asset betas indicate a riskier portfolio, one more sensitive to market fluctuations.

HYPOTHESES, DATA, VARIABLES, AND MODEL

Hypotheses

A priori, the effect of underfunding on pension risk-taking policy may be explained by competing hypotheses: risk management versus risk transfer. One incentive both private and public DB funds may have in common is risk management. An unexpected required funding increase for pension contributions may reduce the state government ability to invest in capital expenditures because, in the short run, the state/municipal budget is fixed. The implications are that, from a risk management perspective, states would prefer to have predictable pension contributions. Accordingly, asset allocation decisions would be a function of funding status—safe, well-funded plans could invest in more risky securities while underfunded plans invest in less risky assets. Alternatively, there is a moral hazard, or risk transfer incentive, to consider, in that taxpayers are ultimately responsible for underfunded public pension plans, and governments may raise taxes to fund plans (Gold 2003). Early research on funding levels, such as Epple and Schipper (1981) or Inman (1981, 1982) suggests that underfunding is a method of passing

current pension costs to future taxpayers. However, politicians' time frames are organized around election cycles and may not focus on long-term funding issues (Giertz and Papke 2007). The risk transfer hypothesis predicts that severely underfunded pension funds would take on more risk.

Other factors may also affect risk-taking investment behavior. Public pension plans have a unique set of issues to consider: politics, fiscal constraints, and public pension accounting. Politics may play a role in that political influence could pressure the fund to buy bonds issued by the state or local government or to direct funds to economically targeted investments. And if these investments provide inefficient returns, then remaining assets may be invested in riskier securities. Furthermore, if states face fiscal limitations that restrict borrowing, pension fund debt may act as a substitute (Novy-Marx and Rauh 2009). Fiscal constraints also cause states to manipulate actuarial assumptions to lower required contributions (Eaton and Nofsinger 2004). Finally, public pension plans are regulated by GASB 25, which allows pension liabilities to be discounted at the assumed rate of return, which is most commonly 8 percent. Higher assumed returns reduce the discounted liabilities, which in turn reduces the required contributions. Accordingly, we add additional hypotheses of political influence, fiscal constraint, and accounting effect.

Finally, there are some factors, such as union membership, demographic make-up of employees, and investment herding behavior that could affect both public and private pension plans. If union membership is associated with better benefits—which in turn creates higher pension obligations—then to cover the increased benefit expense, the investment policy, in terms of equity allocation, could shift. From a demographic perspective, age and gender of DB plan participants may affect the risk-taking behavior of the fund. For example, traditional portfolio

theory expects risk-taking tolerance to decline with age. In addition, mimicking other investment behavior is common among institutional investors. According to Park (2009), managers of pension funds tend to follow peer group norms such that asset allocation to all equity hovers around 64–75 percent. Pension fund managers, like other fund managers, have career concerns and tend not to deviate from peer group investments by holding nonconventional portfolios. Alternatively, public pension plan managers may follow the best performers or plans considered to be large and influential, such as CalPERS. These hypotheses would be union effect, demographic effect, and herding effect.

Data

The major data source is the Public Plans Database (PPD), obtained from the Center for Retirement Research at Boston College (2011). The data are available from fiscal year 2001 to 2009, with a total of 1,134 pension system-year observations, covering 126 pension systems for 50 states and the District of Columbia. We obtain the historical data on the state general obligation bond ratings and net tax-supported debt as a percentage of personal income from Moody's Investors Service. The public employee union membership and coverage data are obtained from the Union Membership and Coverage Database. The economically targeted investment (ETI) information is obtained from the Pension Funds and Urban Revitalization Center, University of Oxford.³

Key variable definition

We measure pension risk as either the percentage of total plan assets invested in the equity market or pension asset beta (Jin, Merton, and Bodie 2006), which is the weighted average beta of all asset classes in a pension plan's total assets. The pension funding ratio is

defined as pension assets' value over pension liabilities. The actuarial funding ratio uses actuarial values for both assets and liabilities, reported in the PPD. The economic funding ratio uses the market value of pension assets and a more realistic discount rate to determine the present value of total future liability payments. Novy-Marx and Rauh (2011) advocate the use of either Treasury rate or municipal bond yield as the appropriate discount factors in estimating public pension liabilities. We obtain the economic pension liabilities for 50 states (excluding D.C.) from Novy-Marx and Rauh (2009, 2011). The measures are available only for fiscal year 2008 and 2009.⁴

Model

We construct four multivariate regression models of public pension risk-taking behavior that combine proxy variables for each hypothesis, where the dependent variable is equity allocation percentage or pension asset beta. A potential issue with the model specification is that equity allocation, the pension funding ratio, and the state rating could be jointly determined. If true, then OLS regression provides biased estimators. In effect, there is a possible feedback effect between equities allocation and underfunding; that is, the causal effect could extend in both directions. Furthermore, the same logic applies to the state rating and pension underfunding. As public pension plans are a contractual liability, lower pension funding could result in lower credit ratings. To account for the endogeneity issue, we construct a simultaneous set of regression equations for equity allocation, state ratings, and funding ratios and use a two-stage procedure to estimate the coefficients. The statistical results from the regression analysis appear in our full-length paper (Mohan and Zhang 2012). The implications from our research are discussed below.

RESULTS

To summarize, using the percentage of total plan assets invested in the equity markets and the pension asset beta as alternative measures of investment risk, we find that government accounting standards strongly affect public fund investment risk. In addition, public funds assume more risk if they are underfunded and have lower investment returns in the previous years. Pension funds in states facing financial constraints also undertake more risk in their pension fund investment.

Public accounting effect

We find government accounting standards to strongly affect public fund investment risk, as higher return assumptions (used to discount pension liabilities) are associated with higher equity allocation and beta. In particular, a 100-basis-point increase in pension return assumption is associated with about 1.72 percent to 4.51 percent increase in equity allocation. The corresponding increase in pension asset beta given a same magnitude increase in the return assumption is 0.04—0.06. This suggests that an important incentive of public pension funds taking high investment risk is to justify the accounting choice. Therefore, determining the appropriate discount rate to measure pension liabilities is an important option to reduce state governments' incentive to take excessive risks.

Risk transfer incentive

Private pension plans appear to take less investment risk when their pension funding ratios are lower. Our results suggest that public funds assume *more* risk if they are underfunded or have lower investment returns in the previous years, evidence consistent with risk transfer or intent to pass underfunded pension obligations to future taxpayers. Again, this risk-taking

behavior is not necessarily in the plan participants' best interest. Taxpayers might be ultimately called upon to close the funding gap. Therefore, pension laws and policies should be in place to restrict state governments' ability to shift their pension risk to future generations.

State fiscal constraint effect

Using Moody's state ratings for general obligation bonds and state net tax-supported debt as a percentage of personal income to proxy for state fiscal constraints, we find that pension funds in states facing financial constraints are more likely to take higher risk in their pension fund investments. Accordingly, to mitigate the state fiscal constraint effect and reduce the incentive to substitute pension underfunding for debt, an alternative option is to switch DB plans to cash balance plans or defined contribution (DC) plans.

Other effects

Our results suggest a degree of "follow the leader," in that plan managers tend to follow the risk-investing behavior of large and high-profile plans (i.e., CalPERS). Furthermore, we report a mild public union effect—that is, in order to provide larger retirement benefits for unionized public employees, fund managers pursue a riskier investment allocation. Finally, limited evidence is offered that economically targeted investment policies are associated with the lower pension investment risk.

SUMMARY AND POLICY OPTIONS FOR ADDRESSING PENSION CRISIS

Overall, our findings suggest that the risk levels of public pension funds are determined by various factors, including state governments' incentives to justify the accounting choice, to shift pension risk to future taxpayers, and to substitute underfunded pension liabilities for

borrowing. A first step toward addressing the problem would be to appropriately discount future liabilities. Under the government accounting standard (GASB 25), public pension plans currently use the expected return on plan assets to discount pension liabilities, which is equal to 8 percent for a majority of pension plans. In a sharp contrast, economists (such as Novy-Marx and Rauh [2011]) suggest that the discount rate should appropriately reflect the risk level inherent with the pension liabilities, and they advocate using either Treasury rate or municipal bond yield as pension liabilities discount rate.⁵ Note that as either rate is much lower than 8 percent, the use of a Treasury rate or municipal bond yield would significantly increase pension liabilities, thus dramatically reducing pension funding ratios.

Some private pension plan solutions could be adopted to address the public pension crisis. An option to limit state government's ability to shift the underfunding burden to future generations is to require pension plans that are at risk or significantly underfunded to make extra pension contributions. This suggestion borrows the insight from private pension plans—PBGC classifies a pension plan as at risk if funding ratio is below 65 percent and has imposed strict requirement on pension contributions and insurance premium for these severely underfunded plans. A growing trend in the private sector is to freeze, terminate, or convert DB plans to cash balance or DC plans. In fact, a growing number of states have departed from the traditional DB pension plans. For example, Utah has required public employees to choose between a DC plan and a hybrid plan—such as a 401(k) component—and employees not making an explicit choice will be enrolled in the hybrid plan.

Finally, state governments could also use a credit market solution to pass pension risk onto investors willing to or having the ability to assume more risks. Novy-Marx and Rauh (2010)

suggest pension security bonds as an option to address the state pension crisis. A key feature for pension security bonds is federal tax subsidies, contingent on the state reducing its underfunding.

NOTES

1. The National Association of State Retirement Administration Web site (<http://www.nasra.org>).
2. Beta measures the sensitivity of financial asset returns to the overall stock market change (i.e., using S&P 500 index as a proxy). Pension asset beta captures the risk of a pension plan's exposure to alternative investments, including private equity, venture capital, hedge funds, and other alternative assets.
3. The data for ETI are available for fiscal years 2001 and 2003. In addition, we obtain the fiscal year 2008 ETI information from a research report conducted by the Office of Program Policy Analysis and Government Accountability of the State of Florida (2008).
4. The major tests are conducted using the actuarial funding ratio based on the full sample from 2001 to 2009. When the economic pension funding ratio is used, the sample is from 2008 and 2009.
5. As a reference, private pension funds use the yield on high quality corporate bonds (i.e., A-rated corporate bonds) as a discount rate, according to SFAS158 issued by FASB.

REFERENCES

- Center for Retirement Research at Boston College. 2011. *Public Plans Database*. Chestnut Hill, MA: Center for Retirement Research at Boston College. <http://pubplans.bc.edu/pls/htmldb/f?p=198:3:3667012107971550> (accessed October 31, 2011).
- Eaton, Tim V., and John R. Nofsinger. 2004. "The Effect of Financial Constraints and Political Pressure on the Management of Public Pension Plans." *Journal of Accounting and Public Policy* 23(3): 161–189.
- Epple, Dennis, and Katherine Schipper. 1981. "Municipal Pension Funding: A Theory and Some Evidence." *Public Choice* 37(1): 141–178.
- Giertz, J. Fred, and Leslie E. Papke. 2007. "Public Pension Plans: Myths and Realities for State Budgets." *National Tax Journal* 60(2): 305–323.
- Gold, Jeremy. 2003. "Risk Transfer in Public Pension Plans." In *The Pension Challenge: Risk Transfers and Retirement Income Security*, Olivia S. Mitchell and Kent Smetters, eds. Oxford: Oxford University Press, pp. 102–115.

- Inman, Robert. 1981. "Municipal Pension Funding: A Theory and Some Evidence: A Comment." *Public Choice* 37(1): 179–187.
- . 1982. "Public Employee Pensions and the Local Labor Budget." *Journal of Public Economics* 19(1): 49–71.
- Jin, Li, Robert C. Merton, and Zvi Bodie. 2006. "Do a Firm's Equity Returns Reflect the Risk of Its Pension Plan?" *Journal of Financial Economics* 81(1): 1–26.
- Novy-Marx, Robert, and Joshua D. Rauh. 2009. "The Liabilities and Risks of State-Sponsored Pension Plans." *Journal of Economic Perspectives* 23(4): 191–210.
- . 2010. "Pension Security Bonds: A New Plan to Address the Pension Crisis." *Economists' Voice* 7(3). <http://dx.doi.org/10.2202/1553-3832.1757> (accessed May 2, 2012).
- . 2011. "Public Pension Promises: How Big Are They and What Are They Worth?" *Journal of Finance* 66(4): 1211–1249.
- Office of Program Policy Analysis and Government Accountability (OPPAGA). 2008. *Economically Targeted Investment Program under Development*. Report No. 08-72. Tallahassee, FL: Office of Program Policy Analysis and Government Accountability. www.oppaga.state.fl.us/reports/pdf/0872rpt.pdf (accessed October 31, 2011).
- Park, Youngkyun. 2009. "Public Pension Plan Asset Allocations." *Employee Benefit Research Institute Notes* 30(4): 1–12.