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Financial Economics and Public Pensions

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Financial Economics and Public Pensions

Introduction

Financial economics (FE) is a branch of economics concerned with the workings of financial markets such as the stock market and the financing of companies. In recent years, proponents of FE have advocated for public pension plans to adopt FE methods as described in a 2003 paper by Dr. Jeremy Gold and Dr. Lawrence Bader.¹ The FE position argues for public pension plans to use a risk-free discount rate in valuing their liabilities. The valuation of pension liabilities is currently an area of contention between FE proponents and those who disagree with the application of FE pricing methods to pension liabilities. Additionally, FE advocates shifting current public pension asset allocations to 100% fixed income. This paper will first provide a short background on the development of FE, then describe the areas of contention surrounding the use of FE and analyze the use of FE proposals as applied to pension plans, as well as discuss their underlying assumptions. Lastly, this paper will examine the implication of FE methods in public pension plans and compare them to traditional public pension plan practices.

FE Asset Pricing Method

Financial economists were influential in the development of pricing fixed income securities, stock options, and more complex financial options, such as derivatives. The FE asset pricing model is exclusively used to determine a price for any fixed income security or stock option (using stock prices as inputs) that is agreeable to both buyer and seller. The pricing of a security under the FE asset pricing model is based on the timing of expected cash flows, and the probability of their payment (the latter concept encompasses both default risk and the volatility risk of a risky asset).

The FE asset pricing method is derived from the Arrow-Debreu economic model. In the FE model, Arrow-Debreu securities are the building blocks of concepts called state-contingent claims (or simply contingent claims). A contingent claim has a schedule of payouts based on the future state of the world. Examples of a contingent claim are stock put or call options; the future payout depends on a present value of a future stock price. The key feature of the FE asset pricing method is the use of a risk-neutral measure, where cash flows are discounted at a risk-free rate. The interest rate on US Treasury securities is the most commonly used proxy for a risk-free rate, followed by LIBOR (London Interbank Offered Rate) or other similar swap rates.

¹ Lawrence N. Bader and Jeremy Gold, *Reinventing Pension Actuarial Science*, The Pension Forum, Volume 15, Number 1 January 2003, available at <http://www.soa.org/library/newsletters/pension-forum/2003/january/pfn0301.pdf>.

Extension of Asset Pricing Methods to Non-Traded Liabilities

The success of the FE pricing model for securities led some financial economists to extend the application of this model to non-traded liabilities (i.e. liabilities that arise in the course of doing business that are never traded). Examples of non-traded liabilities include liabilities that are intrinsic to the nature of certain businesses, such as bank deposit liabilities and insurance company policy claims liabilities. Another notable example of a non-traded liability is the liability for pension payments in a defined benefit pension plan. The valuation of pension liabilities using FE methods is also called market value of liabilities (MVL).

Financial economists believe that the treatment of non-traded liabilities as if they were securities is a small step, based on the complexity of the contingent cash flows used on a daily basis in derivative pricing. However, non-traded liabilities differ from traded securities or derivatives simply because they are never traded. Because they are never traded, non-traded liabilities have no apparent constraint under the no arbitrage principle, which is the fundamental constraint underlying FE asset pricing.

Two Definitions of the Term ‘Market Value’

Another aspect of the FE pension liability pricing controversy is that there are two different uses of the term ‘market value’ used in connection with pension liabilities (or any other in-use non-traded liability):

1. ‘Market value of pension liabilities’ based on an observed market transaction. Pension liabilities are not bought and sold like securities, but they can be settled via the purchase of a group annuity. The price of annuities can be closely estimated based on certain interest rate indices used by annuity providers. In the sense of ‘the amount that the liabilities can be currently settled for’, the tools of financial economics are applicable.
2. ‘Market value of pension liabilities’ derived from the principle that market value is a measure. If it is possible to assign a market value to each of the components of a company (including its pension liabilities), these market values must add up to the market value of the company as a whole (otherwise market value is not a measure in the mathematical sense).

US regulators of private sector pension plans have followed the first sense of the concept of 'market value of pension liabilities', and not the second. For example:

- The Pension Protection Act of 2006 mandates the use of Treasury yield curves to calculate pension liabilities and the unit credit cost method for minimum funding purposes.
- FASB and IASB (the US and International Financial Accounting Standards Boards) mandate the use of currently available yields on high-quality corporate bonds to calculate pension liabilities on the plan sponsor's balance sheet. This liability is considered to be a quasi-market value, similar to the first sense above.

100% Fixed Income Investment versus Traditional Investment Mix

Financial economists advocate that public pension funds should be invested 100% in fixed income.² The original argument applicable to private sector plans is attributed to Tepper, who uses a tax arbitrage argument based on the augmented balance sheet of a corporate pension plan sponsor.³ The crucial assumption in this argument is that before considering the effect of taxes, an investor in the corporate pension plan sponsor is indifferent as to how the pension plan assets are invested.

This argument is extended to public pension plans, substituting taxpayers for investors, but still taking the stakeholder point of view. Their 100% fixed income conclusion rests on an assumption that ordinary taxpayers can borrow for speculative investment at a risk-free interest rate, and the presumption of a highly risk-averse utility function for the taxpayer. The argument concludes that 100% fixed income investment in pension plans is necessary to achieve intergenerational equity.

Bader and Gold suggest that public plans sponsors should try to be ahead of the curve when it comes to shifting towards 100% fixed income to avoid being left holding equities after most other funds have moved to bonds. A portfolio invested 100% in bonds would have a significantly lower long-term expected rate of return than a portfolio with the more traditional mix of 60% in equities and 40% in fixed income. To make up for lower investment earnings, contribution requirements would be greater.

² Bader, Lawrence and Gold, Jeremy, *The Case Against Stock in Public Pension Plans*, October 19, 2004, available at <http://www.pensionfinance.org/papers/publicplaninvestment.pdf>.

³ Tepper, Irwin, *Taxation and Corporate Policy* (The Journal of Finance, March 1981).

For the asset allocation, FE methods tend to over emphasize fixed income investments with low returns. One issue with a 100% fixed income mix is that it does not appear on the efficient frontier.⁴ Determining the asset mix based only on the risk and return characteristics of the assets ignores the fact that the efficient frontier changes when the liabilities are considered. Investments that may not be on the efficient frontier when only the assets are considered may have characteristics that match the underlying liabilities sufficiently so that the risk of extreme volatility in contribution rates and funded ratios can be reduced significantly by including them in the portfolio. The appropriate asset mix for public plans is a balanced portfolio that includes equities, based on an analysis that includes consideration of the underlying liabilities.

The typical asset mix for public plans in Texas is a balanced portfolio with a mix of equities and fixed income investment vehicles. A required shift to 100% in fixed income for a public pension fund would lock in lower rates of return than the rates that could be achieved with more equity exposure, resulting in significantly less investment earnings and higher contributions. The appropriate method is to consider the underlying liabilities in an asset/liability modeling study, and look at risk not just as the standard deviation of returns on the asset portfolio, but consider all the risks including the risk of extreme volatility in the contribution rates and funded ratios.

The Traditional View:

Discount Rate = Expected Return on Invested Assets

In contrast to the FE approach which would require the discounting of pension liabilities at a risk-free rate, the traditional approach is to discount pension plan liabilities at the assumed rate of return on pension plan invested assets. This approach is consistent with the view that market participants (and public plan stakeholders) value in-use non-traded liabilities (such as pension liabilities) based on the estimated cost to meet those liabilities. Combined with an assumption of near full funding of pension liabilities, the basic funding equation $\text{Benefits} + \text{Expenses} = \text{Contributions} + \text{Investment Return}$ ($B + E = C + I$) suggests that pension liabilities should be discounted at the expected rate of investment return.

The National Association of State Retirement Administrators (NASRA) estimates that from 1982 – 2009, 60% of the revenue of US public pension plans was from investment earnings versus 40% from employer and employee contributions.⁵ This statistic underscores the historically key role that investment return has played, combined with historic average funded percentages over 80%.⁶ The Boston College Center for Retirement Research reported 1988-

⁴ The efficient frontier is the highest level of expected return for a given positive level of risk.

⁵ NASRA Issue Brief: *Public Pension Plan Investment Assumptions* (March, 2010).

⁶ GAO Report to the Committee on Finance, U.S. Senate, *State and Local Government Retiree Benefits – Current Funded Status of Pension and Health Benefits* (January, 2008).

2004 defined benefit pension plan investment returns had a weighted median of 10.7%.⁷ Towers Watson reported⁸ 1995-2008 defined benefit pension plan rates of return had a weighted median rate of return of 7.51%. These historical returns are in line with public pension plan assumed rates of return closely centered on 8%. The assumed rates of return used by the 94 public plans overseen by the Pension Review Board are as follows:⁹

<u>Investment Return Assumption</u>	<u>Percent of Plans</u>
4.00%	3%
5.00%	1%
6.50%	2%
7.00%	2%
7.50%	10%
7.75%	13%
8.00%	55%
8.25%	5%
8.50%	9%
Total	100%

⁷ Munnell, A., Soto, M., Libby, J., and Pinzivalli, J., *Investment Returns: Defined Benefit vs. 401(k) Plans*, Issue Brief 52, Center for Retirement Research at Boston College (September 2006).

⁸ Apte, V., McFarland B. *DB vs. DC Plan Investment Returns: The 2008-2009 Update*, Towers Watson (March 2011).

⁹ Pension Review Board, 2009-2010 Biennial Report (November, 2010).

In contrast to the traditional discount rates, the FE approach uses a discount rate that is significantly lower, and as a result, the FE method produces greater liabilities which would require higher contribution rates. The Governmental Accounting Standards Board (GASB) considered the application of certain FE methods in the GASB 27 exposure draft. Though the GASB proposal shifts from the original concept of suggested funding to that of disclosure, the released exposure draft adopts the traditional view relative to the discount rate assumption, except for public pension plans that are projected to run out of assets. In this case, the GASB 27 exposure draft mandates a blended rate, representing expected return on invested assets until the projected trust exhaustion, and the plan sponsor's borrowing rate thereafter.

FE versus Traditional: Cost Method and Asset Smoothing

FE pension pricing must use the Unit Credit cost method, a method that excludes liabilities for future pay increases. This requirement comes from the fact that in FE pricing, one essentially pretends that the liability is a bond with its interest and principal payments matched up with the pension payments, and the liability is what is currently owed – i.e. the plan's liability for current accrued benefits.

Traditional approaches use methods such as Entry Age Normal (EAN), Projected Unit Credit (PUC) or the Aggregate Cost Method that include projected pay in the liabilities. For plans that are not pay-related, PUC and the Unit Credit method are the same. For public plans, it is appropriate to use methods that project salary. Costs are shown as a percent of projected payroll. According to the PRB Guidelines for Actuarial Soundness, the allocation of the normal cost portion of contributions should be level or declining as a percent of payroll over all generations of taxpayers, and the funding of the unfunded actuarial accrued liability should be level or declining as a percent of payroll over the amortization period. The FE cost method, the Unit Credit cost method with no assumption for pay increases, typically is not an appropriate funding method for public plans. The Unit Credit cost method produces a normal cost pattern that increases significantly as a percent of pay. Therefore, the use of the Unit Credit cost method for a final pay plan would violate PRB Guideline #2.

The FE method uses the Market Value of Assets (MVA), and though the MVA should be disclosed, the traditional approach is to allow the use of either the MVA or a smoothed actuarial value of assets. The use of a smoothing method reduces the volatility in contribution rates due to short term investment gains and losses. Many plan sponsors would prefer smoothing of assets to avoid uncertainty in the budget planning process, as stable and predictable contribution rates are generally more preferable to volatile rates for public plan sponsors.

Conclusion

The use of FE methods in public pensions has been a subject of debate in the financial and actuarial community. The application of FE to public pension would lead to significant changes in the traditional asset allocation of public pension plans. Furthermore, the use of a risk-free discount rate to value pension liabilities would lead to higher contribution requirements to fund public pension plans. While voluntary disclosure using FE is not unreasonable, requiring the use of FE for the funding policy and investment policy is not prudent for public pension plans.

Appendix

Timeline of recent events regarding the application of financial economics to US public pension plans:

June 23, 2008: The financial economics topic was debated at the PRB's annual seminar on June 23, 2008, at a session titled "Actuarial Analyses of Financial Economics, Market Value Liabilities, and Liability Driven Investing: A Discussion", with Paul Angelo taking the position against disclosure of MVL and Gordon Latter speaking for the disclosure.

September 8, 2008: The American Academy of Actuaries' Public Interest Committee held a public forum to hear views on the disclosure of market value of assets and liabilities for public pension plans. The committee used information obtained through this forum to determine whether a statement from the Academy's board of directors on the issue is in the public interest.

October 7-8, 2008: The American Academy of Actuaries issued a press release that it would not be issuing a public advocacy statement on the issue of the disclosure of the market value of liabilities at that time. The Academy announced that it will continue to examine issues of relevance to practice in the public plans sector through the formation of a Public Plan Practices Task Force.

October, 2010: The Public Plan Practices Task Force issued their final paper entitled "Risk Management and Public Plan Retirement Systems".

December, 2010: The Public Employee Pension Transparency Act (PEPTA) was introduced in Congress, requiring numerous public pension plan disclosures on an FE basis.

February, 2011: The Actuarial Standards Board of the American Academy of Actuaries issues a discussion draft of ASOP 4 (Measuring Pension Obligations and Determining Pension Plan Costs or Contributions) and an exposure draft of ASOP 27 (Selection of Economic Assumptions for Measuring Pension Obligations). The discussion draft of ASOP 4 defines market-related value of accrued pension benefits.

June, 2011: GASB issues its exposure draft to Statement 27, focusing on public pension plan disclosure, and moving slightly away from the traditional approach by requiring a blended discount rate for poorly funded plans.

January, 2012: ASOP 4 and ASOP 27 exposure drafts issued with May 31, 2012 comment deadline.

