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Measuring Pension Liabilities

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Basic Problem

- Pension plans (by their nature) have lots of liabilities
 - Expected future (recognized) benefit payments
 - Only those earned to date → ABO
 - All → PVB
 - Some projected service/salary increases → PBO, EAN
- Need to value these liabilities
 - By discounting future payments
- **Big question:** at what rate?



Rate set by GASB

- Governmental Accounting Standards Board
 - Private, non-governmental organization
 - Source of GAAP for state and local governments
 - Stated goal:

“to develop high-quality standards of accounting and financial reporting for the state and local governments... [which] lead to information in financial reports that improves transparency, assists users in assessing accountability, and is useful for making decisions”



- Current GASB methodology:
 - Capitalize expected benefit payments at the long-term average expected return on a plan's **assets**
 - Plans basically aim for 8%
 - So GASB effectively specifies discounting projected benefit payments at this rate



GASB Reasoning

- ❑ This rate “best reflects the employer’s projected sacrifice of resources”
 - ❑ The Board “... believes that the present value of the employer’s projected sacrifice of resources is effectively modified (reduced) by the expected return on investments.”
- Is this reasonable?



Is this rate appropriate?

- Actuaries and Accountants
 - Yes!
 - With long horizons stocks have high average returns
 - Asset income will (may) pay for lots of benefits
 - Need to account (credit) for this
- Note: this allows plans to improve funding status by investing in higher return assets
 - Moving a dollar from stocks to bonds makes a plan “wealthier”



Is this rate appropriate?

■ Economists

- No!
- Allows plans to improve funding status by taking on more risk
 - That's what it means to invest in higher return assets
- A \$ of stock is **not** worth more than a \$ of bonds
- Need to discount liabilities accounting for the nature of the liabilities (**not** the asset)
 - This is a fundamental tenet of financial economics
 - The central insight of the CAPM



Obvious Problem

- A plan that has...
 - ❑ \$1 billion in future liabilities
 - ❑ A single dollar of stock
- Is not much better funded than a plan with
 - ❑ \$1 billion in future liabilities
 - ❑ A single dollar of bonds
- GASB's solution: tweak the rules
 - ❑ Proposed amendment to GASB Statement 27



Proposed GASB Rules

- Two different rates
 1. The long-term expected rate of return on pension plan investments
 - “to the extent that plan net position is projected to be sufficient to pay pensions”
 2. High quality muni bond rate
 - For payments for which the earlier condition is not met
- Does solve the obvious problem
 - So is this methodology appropriate?



Simple Example

Two plans, two identical workers

- 30 years old, with 5 years of service

- Plan to retire in 30 years

- Starting benefits recognized under PBO:

Service x Benefit Factor x Projected Final Pay

$$= 5 \times 2\% \times \$105,000 = \$10,500/\text{year}$$

- Liability in 30 years:

- Supposing annuities pay 6% / year on principle

$$\$10,500 / 0.06 = \mathbf{\$175,000}$$



The Two Plans

- Plan A has the first worker
 - Liabilities: \$175,000 in 30 years
 - Assets: \$10,000 invested in the market
- Plan B has the second worker
 - Liabilities: \$175,000 in 30 years
 - Assets: \$20,000
 - \$10,000 invested in the market, \$10,000 in bonds
- Question: which plan is better funded?
 - How much better funded?



GASB's Answer (Current)

- Plan A is **fully funded**

- PV of liability: $\$175,000 / 1.10^{30} \approx \10 k
 - Assumes Expected return on stocks is 10% / year
- So the unfunded liability (under GASB) is ≈ 0

- Plan B is **\$3,000 underfunded**

- PV of liability: $\$175,000 / 1.07^{30} \approx \23 k
 - Assumes Expected return on bonds is 4% / year
- So the unfunded liability (under GASB) is \$3 k



GASB's Answer (Proposed)

- Plan A is still **fully funded**
 - Projected assets cover expected benefit payments
 - So no change in discounting

- Plan B is **\$7,000 underfunded**
 - Projected assets: $\$20,000 \times 1.07^{30} \approx \152 k
 - PV of liability: $(175 \text{ k} - 152 \text{ k}) / 1.04^{30} \approx \7 k
 - Assumes high quality muni bonds yield 4% / year
 - So the unfunded liability (under GASB) is $\sim \$7,000$



Other Problems

- GASB doesn't really specify a valuation methodology
 - Does not associate a given set of assets and liabilities with a net value
- In the previous example the total net underfunding was \$3,000 (\$7,000)
 - What if the two plans merge?
 - Exact same assets, exact same liabilities
- GASB: now \$4,800 (\$14,800) underfunded



- Clearly fails stated goal of “transparent information useful for decision making”
- GASB numbers are essentially meaningless
 - Official GASB recognized underfunding is on the order of \$1 trillion
 - True number is **much** larger
 - A couple **trillion** more



GASB's Problem

- Liabilities have an actual value
 - In and of themselves
- This value does NOT depend on how a plan's assets are invested
 - Moving a dollar from your left pocket to your right pocket can't make you richer
- Need to discount liabilities at rates that reflect their own risks



What Risks?

- Whose point of view?
 - Tax payers, or beneficiaries?
- Promises, or expected benefit payments?
 - Right D.R. depends on assumptions about default and recovery on pension promises
- What accounting concept?
 - Broader concepts exposed to more risks
 - E.g., wage risk— absent from the ABO



Appropriate Discount Rates

- For the ABO:

Assumption	Ideal Discount Rates for Nominal Flows	Approximate Yield Curve
Default in same states of the world, with same recovery rates, as muni debt	Taxable Municipal Yield Curve, adjusted down (partly?) for inflation risk	State-specific muni curve
Accumulated pension promises will be paid by taxpayers	Default-free yield curve, adjusted down (partly?) for inflation risk, and up for liquidity	Treasury curve, or TIPs curve + inflation expectations

- Basically the same answer for broader concepts, but can argue about the “price” of wage risk



Conclusion

- Appropriate discount rates **are** “low”
 - True liabilities are much larger than recognized
 - Trillions of dollars larger
- Appropriate discount rates are **not** pessimistic
 - They don’t imply a belief that the market is going to underperform
 - Simply recognize the possibility
 - Expected asset returns are irrelevant
 - At least for calculating plans’ liabilities



- Plans seem to agree
 - At least by “revealed valuations”
 - Plans hold lots of US government bonds
 - I.e., are willing to pay 98 cents for a one year T-bill
 - That can be used to pay \$1 of benefits next year
 - So must think the obligation has a value of at least \$0.98
 - Despite the fact that it gets to claim it at only \$0.92