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Bring Your Challenges®

Risk Budgeting and Longevity Insurance

Strategies for Sustainable Defined Benefit Pension Funds

Presented by:

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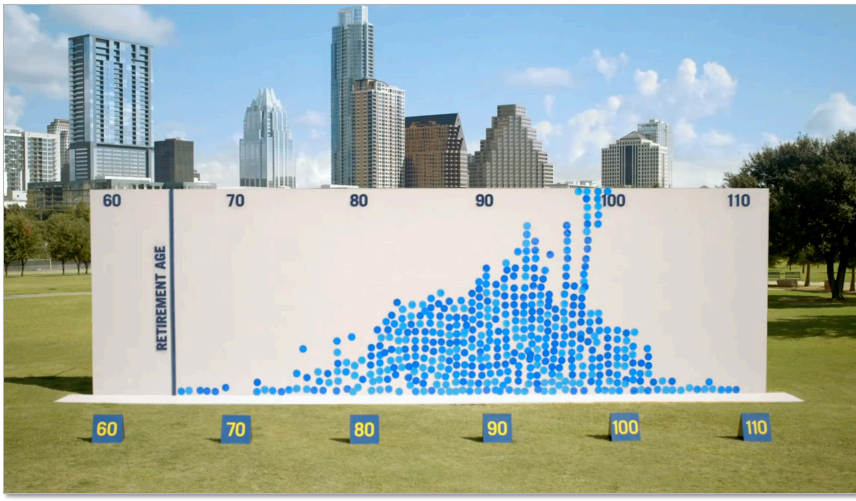
Prudential Retirement®

TODAY'S GENERATION IS LIVING 7 YEARS LONGER THAN THE PREVIOUS ONE.

Source: www.worldbank.org. World Development Indicators. Derived using male and female life expectancy. Life expectancy at birth, total years

Let’s Prepare for a Longer Retirement



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What Are the Key Areas of Risk?

1 **Investment Risk**

Risk that asset performance falls short of expectations

2 **Longevity Risk**

Risk that plan participants and beneficiaries live longer than expected

3 **Inter-generational Risk**

Risk that we pay the benefits of current retirees at the expense of securing the benefits of current employees contributing to the plan

Failure to manage these risks is behind today’s growing funding gap.

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What Are the Key Areas of Risk?

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Investment Risk

Risk that asset performance falls short of expectations

Management

- Risk Budgeting
- Lower risk / lower volatility investing *(LDI, absolute return, illiquid fixed income)*

2

Longevity Risk

Risk that plan participants and beneficiaries live longer than expected

Management

- Retirement age increases with healthy life expectancy; safety net for disabled workers
- Insure remaining longevity risk

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Inter-generational Risk

Risk that we pay the benefits of current retirees at the expense of securing the benefits of current employees contributing to the plan

Management

- Protect contributions of working age plan participants through prudent investment and longevity risk management

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The DB Sustainability Model

The Defined Benefit Sustainability Model will help pension funds regain and maintain a path toward a stable and sustainable future.

Investment Risk Management

- Risk Budgeting
- Lower risk / lower volatility investing *(LDI, absolute return, illiquid fixed income)*

Longevity Risk Management

- Retirement age increases with healthy life expectancy; safety net for disabled workers
- Insure remaining longevity risk

Inter-generational Risk Management

- Protect contributions of working age plan participants through prudent investment and longevity risk management

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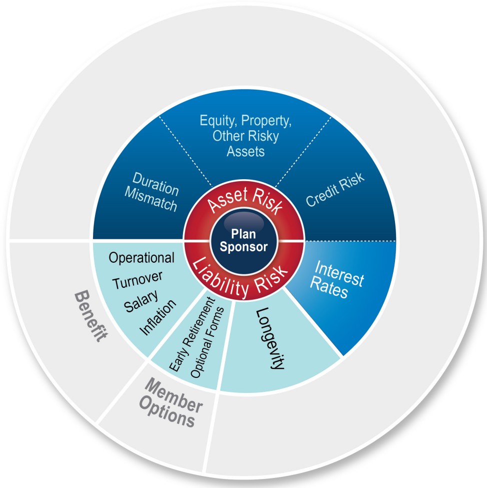
Pension plan sponsors are surrounded by risk.



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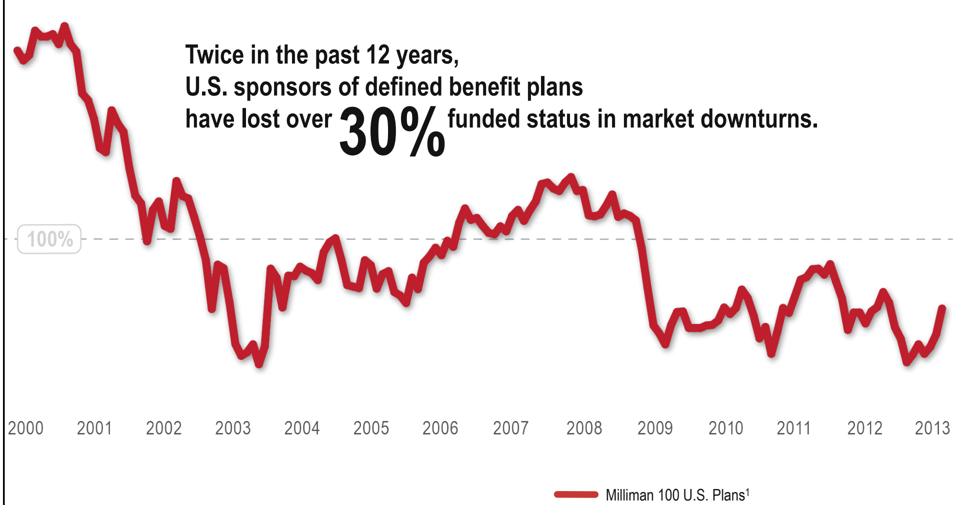
Corporate Funded Status Volatility Has Been Excruciating and Very Expensive



[1]Source: Milliman 100 Pension Funding Index; the 100 largest U.S. corporate pension plans.

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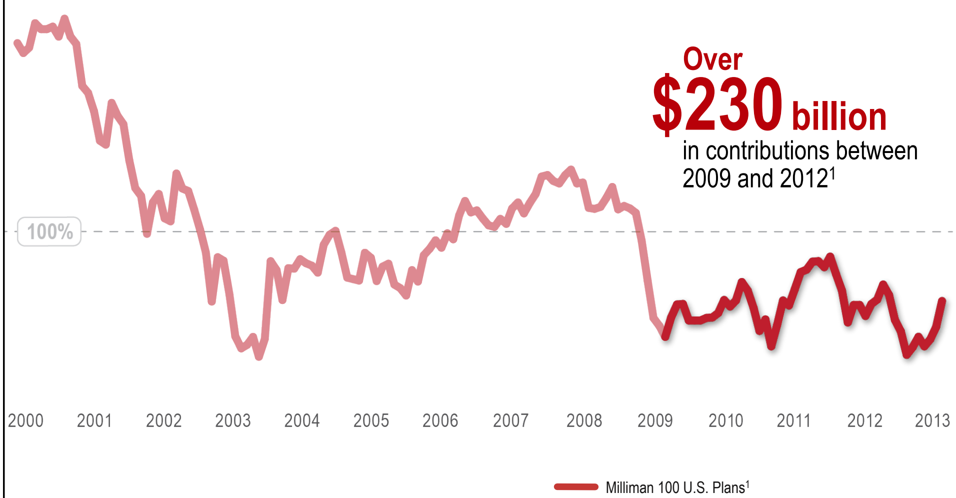

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Corporate Funded Status Volatility Has Been Excruciating and Very Expensive

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[1]Source: Milliman 100 Pension Funding Index; the 100 largest U.S. corporate pension plans.
[2]Source: Aon Hewitt, *"Aon Hewitt Global Pension Risk Tracker,"* as of February 28, 2013. https://rfmtools.hewitt.com/PensionRiskTracker.
Funding ratio (cumulative assets/liabilities) of all pension schemes in the FTSE 100 index on the accounting basis.

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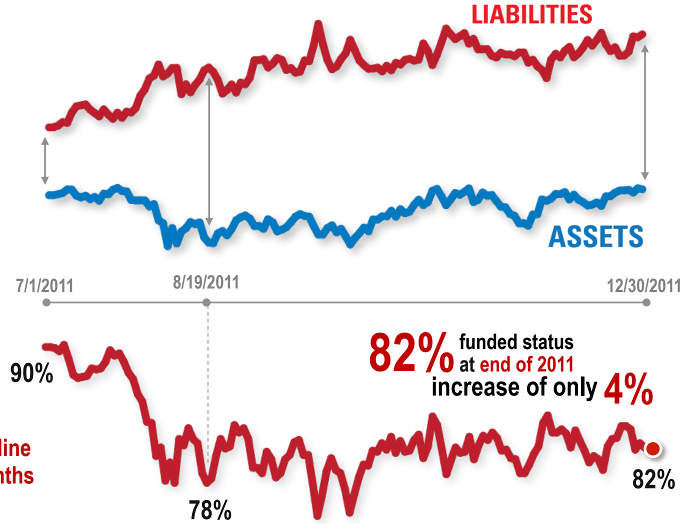
For U.S. Corporate Plan Sponsors, Risk Taking is Still the Norm

Scenario: Real life
July 1, 2011 to August 19, 2011

- Rates fall by **115 bps**
- Equities fall by **16%**



12% funded status decline in less than 2 months

Source: Aon Hewitt, "Aon Hewitt Global Pension Risk Tracker," as of December 30, 2011, https://rfmtools.hewitt.com/PensionRiskTracker. Note: Cumulative assets (in billions U.S.D) and liabilities of all pension schemes in the S&P 500 index on the accounting basis. Source for interest rate data: The U.S. Department of the Treasury Resource Center. Reflects the 10-year U.S. Treasury, taken from the Daily Treasury Yield Curve, which was at 3.22% on July 1, 2011 and 2.07% on August 19, 2011. http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldAll. Source for equity data: Bloomberg. Reflects the S&P 500 Index, which closed at 1339.67 on July 1, 2011 and 1123.53 on August 19, 2011.

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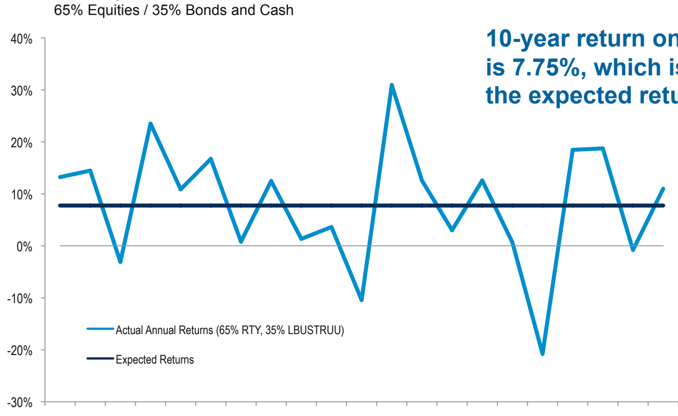
The Current Approach for Public Pension Plans is Volatile and Unsustainable

Volatility of Returns
65% Equities / 35% Bonds and Cash



10-year return on this asset mix is 7.75%, which is the same as the expected return, BUT…

Source: Prudential. In this illustration, the returns depicted are a weighted mix of actual returns with 65% from the Russell 2000 Equity Index (RTY) and 35% from the Barclays U.S. Aggregate Bond Index (LBUSTRUU). Weighted returns are shown from December 1990 to December 2012.

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The Assets Invested Fall Far Short of the Liabilities

Expected return on assets	7.75%
Liability Growth Rate	7.75%
10-year realized return on assets	7.75%
Funded status	60%-65% of the liability
Funds invested in assets	60%-65% of the liability
Expected return on air	0%
Allocation to air in the portfolios	35%-40% of the liability

Source: Prudential. For illustrative purposes only.

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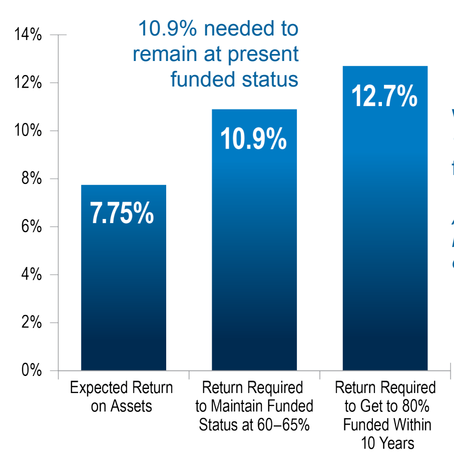

Without cash contributions, 12.7% needed to reach 80% funding within 10 years

Assumes no unexpected increase in longevity and no periods of higher than expected inflation

Source: Prudential. The return required to maintain or improve the funded status is calculated by Prudential assuming a typical open public plan in the U.S. with cost of living adjustments in its benefits, and further assuming a starting funded status of approximately 63% and benefit payments that increase by 5% per year.

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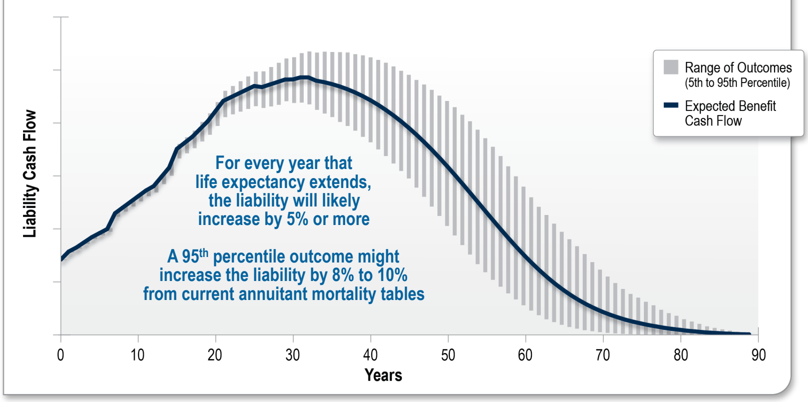
Longevity Risk Needs to Become Part of the Equation Because it is Material

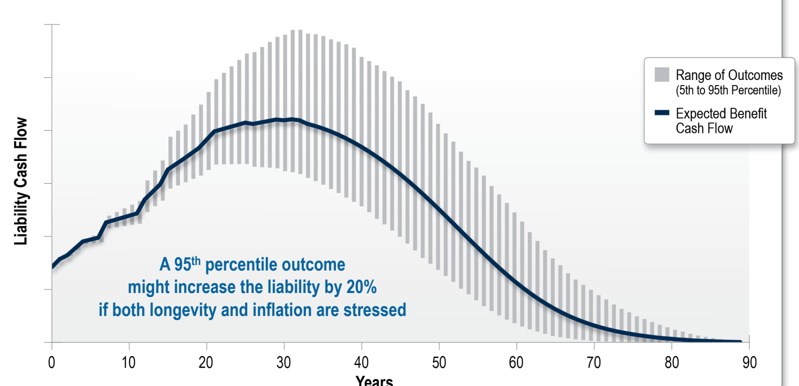
Potential Variability in Future Benefit Cash Flows Due to Longevity Risk



Source: Prudential. Assumes a pension fund with 36% retiree liabilities and 64% deferred and active liabilities, though no future accrual is assumed for active members. The average age of retired members is 69 and the average age of deferred and active members is 46. Benefits include cost of living adjustments, which are assumed at a fixed escalation rate of 3%. Longevity improvements are simulated in a fully stochastic analysis.

Longevity and Inflation Risk Combine to Magnify Concerns

Potential Variability in Future Benefit Cash Flows Due to Longevity and Inflation Risk



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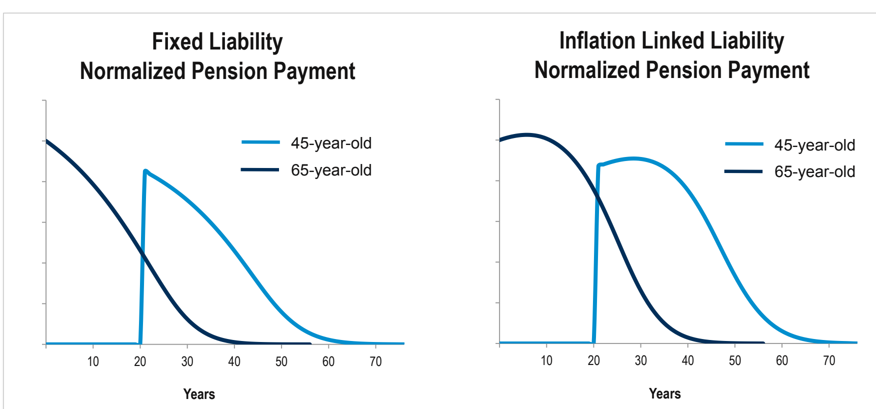
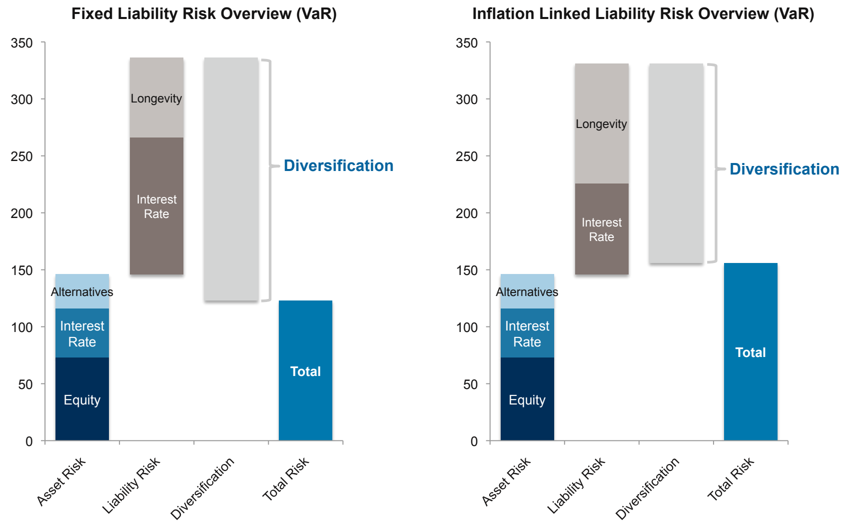
Risk transfer decisions made without longevity risk in the picture will consistently undervalue the benefits of risk management.



Source: Pacific Global Advisors

Risk Overview for Fixed Liability and Inflation Linked Liability Cases (VaR)

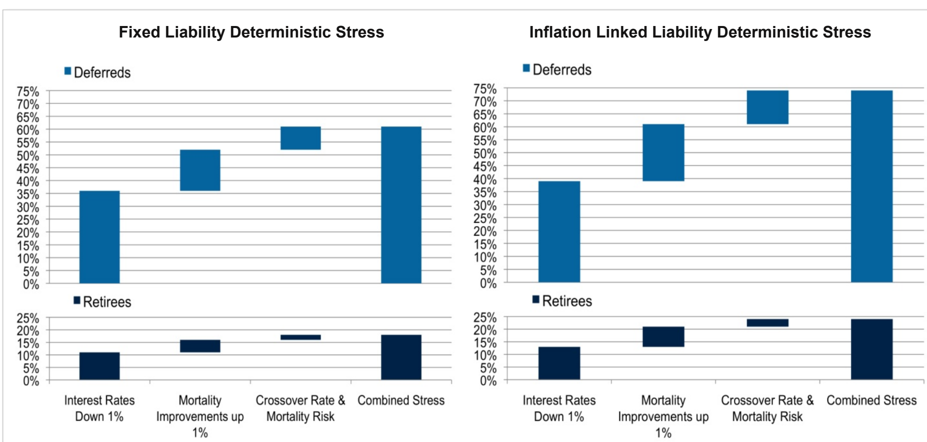


Source: Pacific Global Advisors

Inflation Linked and Deferred Liabilities are the Most Risky for a Pension Fund

Deterministic Stress on Liabilities

(Impact of a 1% Decline in Rates and a 1% Increase in Mortality Improvements)



Source: Pacific Global Advisors

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Interest rate risk, longevity risk, and inflation risk compound each other in the pension liability

therefore

leaving longevity risk out of the analysis will underestimate total risk

especially in regard to

inflation linked liabilities and deferred liabilities, because their longer durations make them significantly more sensitive to adverse outcomes

What Was the Conventional Role of Risk for Pension Funds?

Source: Prudential

In the Future, How Can Pension Funds Manage and Budget Total Risk?

It is important to ensure that the potential **losses are budgeted** so their impact on required pension contributions in the medium term is **affordable for the plan sponsor.**

Debt burden | Tax burden | Shareholder's equity | Free cash flow

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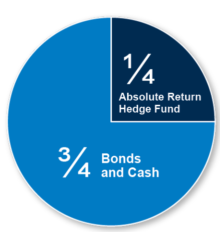
Allocating the Risk Budget—Sustainability Model

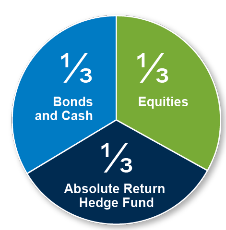
Closed Plan



Longevity risk is insured or hedged

Risk budgeting is used to gauge whether potential losses are affordable

Open Plan



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Source: Prudential

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A Pension Fund is the Plan Sponsor's Insurance Subsidiary

Pension Funds		Mono-line Pension Insurers
Generally underfunded	Funded Level	Fully funded, plus reserves and capital
High allocation to risky assets	Asset Strategy	Asset and liability matching
Generally unhedged	Longevity Risk Strategy	Generally reinsured

The halfway point between these two models is a sensible approach for pension plans.

Source: Prudential

Let's prepare for a longer retirement with **sustainable DB plans.**

The retirement security of real people depends on it.

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