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What if 8% is Really 0%?

Pension Funds: Investing with Fingers-Crossed and Eyes Closed

It is well known that pension funds in the United States are underfunded even if they achieve their projected 8% rate of return. The scope of pension underfunding increases to an astonishing level when more probable future rates are employed. A reduction in the future rate of return from 8% to the more reasonable risk-free rate of approximately 4% causes the liabilities to explode by trillions of dollars. As bond yields declined over the past twenty years, pension funds moved toward more aggressive equity-based portfolios in an attempt to reach for this 8% return. By investing in a portfolio with uncertain outcomes, pension funds could experience increasingly volatile and even negative returns. Paradoxically, in an effort to chase the universal 8% rate, pension funds may be laying the groundwork for returns even lower than the risk free rate. In an effort to offer an empirical basis for this possibility, we conclude the paper with a relevant comparison - the return of a hypothetical Japanese pension for the past two decades. We believe that pension funds need to at least prepare for the unfathomable: 0% returns for 20 years. Most pension funds, regrettably, have not adequately stress tested their portfolios for these scenarios.

Acknowledgements

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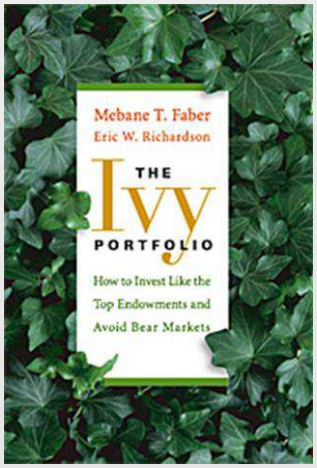
Mebane T. Faber



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THE ARBITRARY 8% RETURN ASSUMPTION - *IT'S WORSE THAN IT LOOKS*

The woeful state of private and public pension funds in the United States has recently received significant attention in the popular press and in political debates. The average funding ratio at public and private pension funds currently hovers around 80%, the very minimum level that plan sponsors consider as an acceptable measure of funding. To arrive at this 80% figure, funds divide their total assets by their total liabilities (discounted back to the present).

As a frame of reference, state pension funding on an aggregate basis was 102% in 1999 and has steadily declined to 84% by 2008 (assets of $2.31 trillion and liabilities of $2.77 trillion). Some funds are in far worse shape (i.e. Illinois at 54% funded), and 21 states have less than 80% of their pension fund obligations funded.[1]

The choice of the discount rate is controversial and will have a profound effect on the approximated value of future liabilities due to the effects of compounding over time. The universally assumed rate of return for virtually all public government and corporate pension funds is approximately 8.0%.[2]

The first major problem outlined in this paper is that the outlook for pension funds becomes far worse when realistic investment return projections are considered. Andrew Biggs calculates that if a more conservative rate of return is considered, such as the risk-free rate on government bonds, the average funding ratio at public pension funds declines from 83% to 45%.[4]

Likewise, discounting with the risk-free rate, Rauh and Novy-Marx calculate that the 50 U.S. states pension plans have $1.94 trillion in assets versus liabilities of $5.17 trillion, resulting in a funding ratio of only 38% and cumulative unfunded pension liabilities of $3.23 trillion. This $3.23 trillion vastly exceeds the states' publicly traded debt of $0.94 trillion and would require significant debt issuance or increased tax revenue.[5]

Another recent report from the Stanford Institute for Economic Policy Research illustrates the stark conclusion that by reducing the discount rate of 7.5%-8.0% used by the California pensions (CalPERS, CalSTRS, UCRS) to a risk-free rate of 4.14%, unfunded liabilities would balloon almost 700% from $55.4 billion to $425.2 billion for California alone.[6]

HOW DID 8% BECOME ANCHORED IN PENSION ACCOUNTING?

CalPERS and other public pension funds argue that an 8% discount rate (technically CalPERS assumes a 7.75% return of return) is appropriate given their long-term rate of return historically has been around 8%. While public pension funds have returned this 8% target over the past twenty-five years, the big question is, "Are they likely to hit that target going forward?"

[1] The PEW Center on the States, *The Trillion Dollar Gap: Underfunded state retirement systems and the road to reform*, February 2010.
[2] NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, & Analyst's Accounting Observer.
[4] Biggs, An Options Pricing Method for Calculating the Market Price of Public Sector Pension Liabilities, February 2010.
[5] Novy-Marx & Rauh, The Liabilities and Risks of State-Sponsored Pension Plans, Fall 2009.
[6] SIEPR, "Going For Broke", April 2010.

Historical global macro data over the past two decades may provide a broader answer. Twenty-five years ago long-term interest rates in the Unites States were around 10% and the P/E Ratio for U.S. stocks was around 10. Both were at the early stages of long bull markets.

In 2011, long term interest rates stand at approximately 4%, and US stocks at a 20+ P/E Ratio that historically has produced substandard returns in equities.[8] Given these headwinds domestic equities and bonds could deliver low returns going forward just at the moment when many pension funds have expanded into other equities and equity-like classes looking for alternative sources of equity returns.

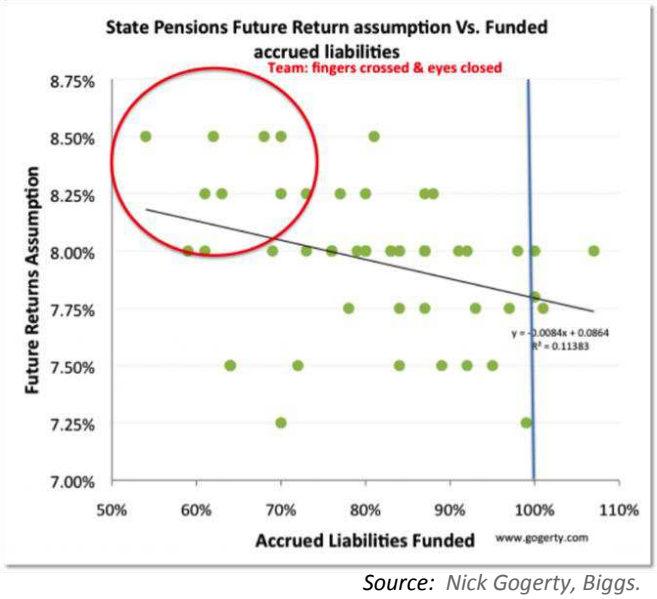
HOW DOES A PENSION MANAGER GET TO 8% IN THE CURRENT ENVIRONMENT?

With government bonds yielding about 4% plan sponsors must invest in other outperforming assets to bring the cumulative return to 8%. The problem with allocating assets away from the risk-free rate is that they are, by definition, risky and uncertain. If a pension manager is employing the benchmark 60% stock/40% bond allocation, the 60% in equity or diversifying assets must return approximately 11% to achieve 8% total returns.

The second major problem outlined in this paper is that pension managers, in an attempt to deal with the realities of underfunding, may be tempted to chase higher performing and riskier asset classes, and may end up compounding the underfunding problem even more through exposure to these risky asset mixes.

Interestingly, according to Biggs, the targeted equity allocation does not correlate with projected return. Even worse, as shown in Exhibit 1, funds using the highest return assumptions have the most underfunded pensions, a scenario that could be called, "fingers crossed and eyes closed" [9]

EXHIBIT 1 – STATE PENSION RETURN ASSUMPTIONS VS. FUNDING STATUS



Source: Nick Gogerty, Biggs.

[8] Robert Shiller, Website

[9] One of our favorite articles on the subject is a Research Affiliates piece titled Hope is Not a Strategy.

FROM 60/40 TO THE ENDOWMENT MODEL

Funds, seeing the difficulty in the above math, have explored other solutions to achieve this 8% return. As the dot-com crash erased a period where real money funds increasingly allocated to equities, Yale's portfolio management model, or the "Endowment Model," became the strategy to emulate among real money managers. The Endowment Model was popularly interpreted as a broadly diversified global portfolio, with heavy equity orientation, seeking a premium for taking on liquidity risk. As seen below in Exhibit 2, in a period of flat equity returns, the endowment model shined and outperformed stocks, bonds, and the 60/40 allocation (which most university endowments follow fiscal year ending June 30th).

EXHIBIT 2 – RETURNS OF ASSET CLASSES AND PORTFOLIOS, 6/30/2000 – 6/30/2008

2000-2008 Fiscal June 30 End	HARVARD	YALE	S&P 500	MSCI EAFE	10Yr US	REIT	GSCI	T Bills	60% Stocks 40% Bonds
CAGR	13.95%	16.81%	0.88%	6.04%	6.43%	12.04%	18.54%	3.26%	3.51%

Source: Author, Global Financial Data, Harvard and Yale Annual Reports

The focus on illiquid assets (private equity, venture capital and timberland investments, for example) made the Endowment Model particularly attractive to funds that in theory have long time horizons, such as endowments and pensions.

Yet, as real money investors sought diversification through the same methodology, their portfolios were, in fact, becoming more correlated to each other while portfolio risks were becoming more concentrated and increasingly dependent upon illiquid equity-like investments.

Most real money funds were not prepared for the following stress scenario to their portfolio:

- US and Foreign Stocks declining over 50%
- Commodities declining 67%
- Real Estate (REITs) declining 68%

The figures above are the peak drawdowns from the bear markets of 2008-2009, and, importantly, they all occurred simultaneously. It is critical that pension funds – especially funds pursuing high equity allocations – consider all possible stresses to portfolio viability.

Exhibit 3 demonstrates that during the fiscal year ending June 30, 2009, the S&P 500 was down 26 percent, while most real money investors suffered losses in the 20% to 40% percent. Yale's endowment assets fell from almost $23 billion to $16.3 billion for fiscal year 2009, a decline of almost 30%.

EXHIBIT 3 – RETURNS OF ASSET CLASSES AND PORTFOLIOS, 6/30/2008 – 6/30/2009

2009 Fiscal June 30 End	HARVARD	YALE	S&P 500	MSCI EAFE	10Yr US	REIT	GSCI	T Bills	60% Stocks 40% Bonds
CAGR	(27.30%)	(24.60%)	(25.95%)	(30.96%)	7.10%	(40.62%)	(59.68%)	0.55%	(12.73%)

Source: Authors, Global Financial Data, Harvard and Yale Annual Reports

The crash of 2008 highlighted some drawbacks in the application of the Endowment Model, namely that (a) the benefits of diversification during market crisis events may not hold up, and (b) time horizons are not as long as envisioned for investors with annual liquidity needs.

ARE REAL MONEY FUNDS PREPARED FOR STRESS? THE JAPANESE COMPARISON

Are funds prepared for a lengthy bear market in equities like when stocks declined nearly 90% in the 1930's? Are funds prepared for both raging inflation of the 1970's and 1980's and sustained deflation like Japan from 1990 to the present? It is our opinion that most funds do not consider these outcomes as they are seen as extraordinary and beyond the scope of either feasible response or possibility.

To provide perspective, a post 1980's Japan comparison may shed light on public portfolio policy going forward.

A proxy can be created tracking the average US endowment with a 20% allocation each to US Stocks, Foreign Stocks, US Government Bonds, REITs, and Commodities. This monthly rebalanced allocation would have returned 5.58% over the past 10 years, in-line with the average endowment with similar volatility and a high correlation coefficient. The very best endowments, the Harvard and Yale portfolios, historically have outperformed the average endowment by about 300-400 bps.[10]

We examine a similar allocation from the perspective of a Japanese pension: 20% each allocated to Japanese stocks, world stocks, Japanese 10-Year Bonds, Japanese REITs, and commodities (all Yen denominated). We included a 60/40 allocation for comparison, with all series rebalanced monthly.[11]

Below in Exhibits 4 and 5 are tables of returns to those same asset classes over different measurement periods: the decades of the 1980s, the 1990s, and the 2000s. Also included are the entire period, 1980-

EXHIBIT 4 – U.S. ASSET CLASS NOMINAL RETURNS

	S&P 500	MSCI EAFE	10Yr US	REIT	GSCI	T Bills	60% Stocks 40% Bonds	Buy Hold 20% Each	Inflation
1980s	17.55%	22.77%	13.01%	12.51%	10.67%	9.23%	16.18%	15.93%	5.10%
1990s	18.21%	7.33%	8.02%	8.10%	3.89%	4.98%	14.25%	9.73%	2.93%
2000s	(0.91%)	1.57%	7.06%	10.19%	5.05%	2.74%	3.10%	5.58%	2.52%
1980-2009	11.25%	10.21%	9.16%	10.25%	6.49%	5.62%	10.80%	10.33%	3.51%
1990-2009	8.23%	4.41%	7.54%	9.14%	4.47%	3.86%	8.54%	7.63%	2.73%

EXHIBIT 5 – JAPANESE ASSET CLASS NOMINAL RETURNS.

	Japan TOPIX	World Stocks	10Yr Japan	TOPIX REIT	GSCI Yen	T Bills	60% Stocks 40% Bonds	Buy Hold 20% Each	Inflation
1980s	21.30%	13.93%	9.29%	20.38%	5.13%	5.12%	16.67%	15.14%	2.33%
1990s	(4.25%)	8.20%	7.04%	(13.35%)	0.40%	2.62%	0.78%	0.64%	1.08%
2000s	(4.98%)	(0.72%)	1.75%	4.20%	4.05%	0.24%	(1.89%)	2.21%	(0.29%)
1980-2009	3.34%	6.96%	5.98%	2.82%	3.17%	2.64%	4.88%	5.80%	1.03%
1990-2009	(4.62%)	3.64%	4.36%	(4.98%)	2.21%	1.42%	(0.56%)	1.42%	0.39%

Source: Authors, Global Financial Data.

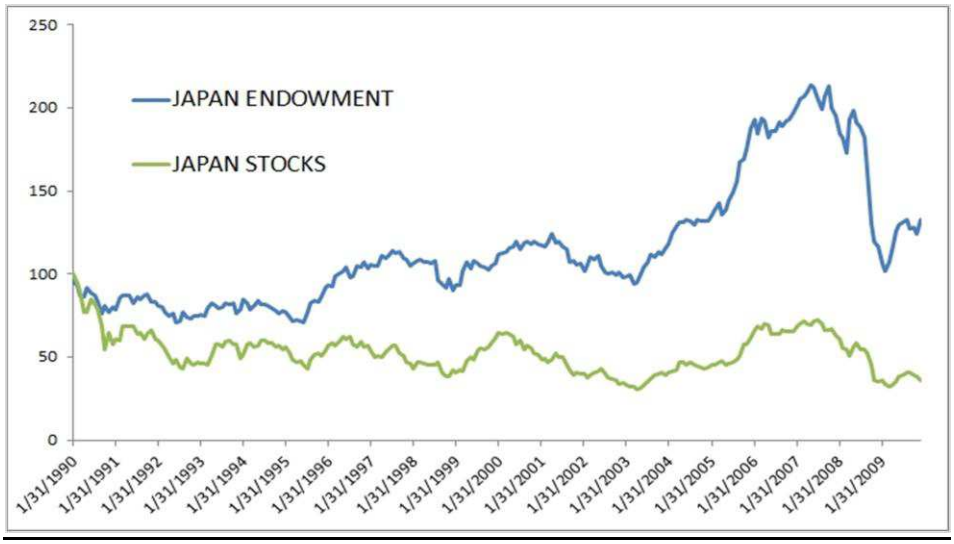
[10] A recent paper by Mladina and Coyle, "Yale Endowment Returns: Manager Skill or Risk Exposure?", breaks out the allocations further with size and style tilts. They find that strong returns by Yale's Endowment may be explained by two factors: (1) Consistent exposure to diversified, risk-tilted, equity-oriented assets; and (2) extraordinary performance in private equity, and venture capital, in particular.

[11] The Japanese Government Pension Investment Fund is the world's largest at $1.4 trillion: Approximately 67% of the assets are invested in Japanese bonds, with the remainder in Japanese stocks (11%), foreign stocks (9%), foreign bonds (8%), and cash (5%).

2009, and 1990-2009.

Both countries experienced spectacular returns in the 1980s as interest rates peaked and inflation began its long decline. However, the markets experienced a divergence starting in 1990. While the US experienced a decade of stellar returns, Japan began the "Lost Decade" as their real estate and equity

EXHIBIT 6 – JAPANESE ALLOCATIONS, 1990 - 2009



Source: Authors, Global Financial Data

bubbles popped. The Lost Decade turned into the Lost Decades as Japan's returns over the past twenty years have been relatively flat as seen in Exhibit 6.

A pension fund manager examining the history of Japan and capital markets should take note of the two central points of this paper. First, that the endowment-style portfolio returned just 1.42% in Japan over the past two decades, far less than the 8% assumption employed by many U.S. public pension funds. Second, a Japanese pension fund manager who chose to chase returns by investing in equities over the past twenty years would have exacerbated his problems by generating returns of -4.62% versus Japanese government bond returns of 4.36% per year.

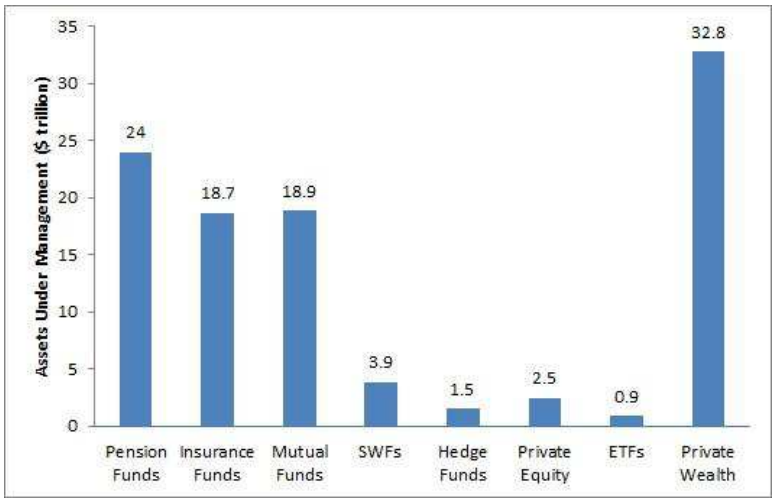
By diversifying away from bonds and into risky assets, the endowment style portfolio has the potential to perform better, but also worse than the risk-free rate. Again, the attempt to chase returns using riskier equity assets can backfire as bonds returned 4.36% per year over the period.

Many analysts take the position that Japan is not a fair or relevant comparison. However, recall that in 1989 Japan was the emerging economic superpower with an equity market representing approximately 40% of the world's total. Even after two decades of muddled growth, Japan is still the number three global economy, although the Japanese equity market capitalization is now less than 10% of the world's equity market capitalization. The Federal Reserve Bank of St. Louis President James Bullard recently proclaimed "The U.S. is closer to a Japanese-style outcome today than at any time in recent history."

WHY THIS MATTERS TO YOU (THE TAXPAYER)

While the point of this article is not to talk about policy measures, the health of U.S. pension funds is of critical importance to U.S. citizens as they are the backstop for both private and public pension funds as taxpayers. Shortfalls in public plans result in a reduction or loss of public and government services and increased federal, state and local taxes. Most state constitutions require these debts to be paid.

EXHIBIT 7 – REAL MONEY ASSETS, 2008



Source: Drobny, The Invisible Hands

Real money funds, another name for the $62 trillion of capital managed by unlevered institutions, comprise a majority of the world's managed assets as seen in Exhibit 7. Of that $62 trillion, global pension fund assets totaled $24 trillion with U.S. pension funds comprising 60% of the total with $15 trillion in assets.[12] Pension funds are big money – roughly an order of magnitude bigger than the entire hedge fund industry.

There are over 200 defined benefit plans operated by the states covering 20 million employees, 7 million retirees, and roughly 90 percent of public sector workers in the states. How many pension funds will go bust at 4% returns, and then ask how many additional will fail after 0% returns for two decades?

The taxpayer bailout acts as a put option to the plan sponsor. When a state comes up short funding their pension liabilities, they "put" those liabilities into the hands of taxpayers. Considering the sheer size of pension plans, this taxpayer backstop could reach trillions of dollars. Novy-Marx estimatesunderfunded liabilities for state pensions equate to an obligation of roughly $10,000 for each United States citizen.

Millions of Americans could suffer higher contribution requirements, lower benefits, and an increased retirement age. To fully fund their obligations, pensions need higher contributions and more accurate accounting based on more realistic return assumptions.

[12] Drobny, The Invisible Hands, 2008.

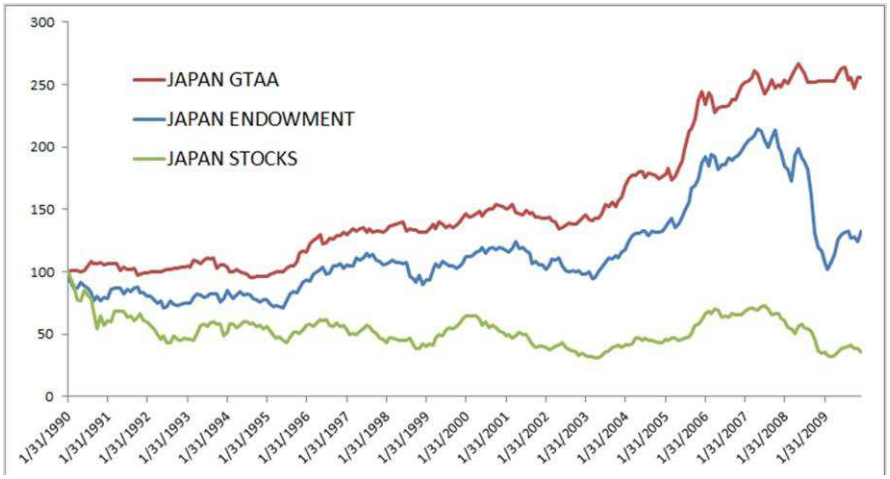
A RISK BASED APPROACH

While the point of this paper is to demonstrate the need to think broadly about all possible market outcomes, many clients and investors wonder how Cambria's risk managed models would have performed in the case of Japan during their Lost Decades.

Below are the returns of the hypothetical Japanese endowment as well as a risk-managed portfolio based on the global tactical asset allocation (GTAA) system presented in our 2007 white paper.[13] All returns are hypothetical total nominal returns gross of any fees or transaction costs. This risk-based approach did a respectable job of avoiding bear markets and beating both equities and the buy and hold benchmark. Note, however, that even this nine percentage point annual improvement over equities did not return 8% a year.

EXHIBIT 8 – 1990-2010 RETURNS TO VARIOUS PORTFOLIOS

	Total Return	Compound Return
JAPAN GTAA	155.87%	4.81%
JAPAN ENDOWMENT	32.62%	1.42%
JAPAN STOCKS	-61.17%	-4.62%



[13] Faber, "A Quantitative Approach to Tactical Asset Allocation", Spring 2007.

FURTHER READING

Why the Yale Model Doesn't Work for Everybody – Fox
Singapore's Lesson from Harvard Model – Tett
A Gold Plated Burden – Economist
While America Aged - Lowenstein

DATA SOURCES

All of the below indexes are total return series provided by Global Financial Data:

- S&P 500 Index
- MSCI EAFE
- U.S. Government 10-Year Bonds
- Goldman Sachs Commodity Index (GSCI)
- Japan TOPIX Total Return Index
- Global Financial Data World Equity ex-US Total Return
- Japan 10-Year Government Bond Total Return Index
- Japan TOPIX REIT Index
- National Association of Real Estate Investment Trusts Index (NAREIT) is provided by REIT.com

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