

**Actuarial Liability Pricing Does Not Reflect Risk:
Risky Assets are Still Risky in the Long Run and
There is No "Free Lunch"**

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Actuarial Valuation of Pension Liabilities Do Not Reflect Risk Valuation of Promised Benefit of \$1000 in 30 Years

| Fraction of Portfolio in Equities | Expected Return on Fund Asset Portfolio | Actuarial Present Value of Liabilities | Benefit Shortfall Guarantee Pmt Premium | Cost of Actuarial Value & Guarantee |
|-----------------------------------|---|--|---|-------------------------------------|
| 0.0 | 3.0% | \$407 | \$ 0 | \$407 |
| 0.1 | 3.5% | 350 | 63 | 413 |
| 0.2 | 4.0% | 301 | 113 | 415 |
| 0.3 | 4.5% | 259 | 156 | 416 |
| 0.7 | 6.5% | 142 | 276 | 418 |
| 0.8 | 7.0% | 122 | 296 | 419 |
| 0.9 | 7.5% | 105 | 314 | 419 |
| 1.0 | 8.0% | 91 | 328 | 419 |

Expected return on equities = 8%

Standard deviation of return = 20%

30-Year UST Bond = 3%

(Rates used are continuously compounded)

Can the Stock Market Greatly Underperform over 30 Years?
 Japan Third Largest Economy in the World:

Nikkei 225 Stock Market 1984-2013

| | |
|------|----------------------|
| 1984 | 10,071 |
| 1989 | 31,577 |
| 1990 | 37,242 [High 38,951] |
| 1991 | 23,271 |
| 1992 | 22,076 |
| 1993 | 17,038 |
| 1994 | 20,256 |
| 1995 | 18,647 |
| 1996 | 20,806 |
| 1997 | 18,308 |
| 1999 | 14,544 |
| 2000 | 19,537 |
| 2001 | 13,741 |
| 2002 | 10,027 |
| 2003 | 8,286 |
| 2004 | 10,785 |
| 2005 | 11,422 |
| 2006 | 16,929 |
| 2007 | 17,377 |
| 2008 | 13,518 |
| 2009 | 7,909 |
| 2010 | 10,212 |
| 2011 | 10,282 |
| 2012 | 8,789 |
| 2013 | 11,153 |