



*The Problems  
With  
Pension Finance*

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# Pension Plan Objective

**Fund Liabilities at the **Lowest Cost** to the Plan**

**Lowest Cost** = **Assets fully fund Liabilities**  
**No Contributions**  
**“Pension Holiday”**

**Problem** = **Assets do not know Liabilities**  
**Assets are not managed vs. Liabilities**

# Risk

<b>Tradition</b>	<b>Volatility of Total Returns</b>
<b>ALM</b>	<b>NOT Meeting the Client Objective</b> <b>Objective is Liability Driven</b> <b>Not Matching and Funding Liabilities</b>
<b>Examples</b>	<b>S&amp;L, Pensions, Healthcare</b>
<b>Sharpe</b>	<b>Old Ratio = Based on 3 month T-Bill</b> <b>New Ratio = Based on Objective</b> <b><i>(Information Ratio)</i></b>

# Actuarially Sound

**If :**                    **Assets achieve ROA**  
                              **Pension Makes All Future Contributions**

**Then :**                **Plan will be Fully Funded at End**  
                              **(30 years ?)**

**Today :**              **Might have a Major Deficit !**

# **Bad Pension Rules**

**Led to :**

**Bad Benefit Decisions**

**Bad Contribution Decisions**

**Bad Asset Allocation Decisions**

# Smoothing of Assets

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
5 Year Average	15.64%	17.76%	20.38%	14.15%	10.03%	3.15%	2.88%	1.93%	3.32%	6.85%
Annual Returns	22.98%	21.37%	13.69%	-2.50%	-5.40%	-11.41%	20.04%	8.92%	4.43%	12.25%
Difference	-7.34%	-3.61%	6.69%	16.65%	15.43%	14.56%	-17.16%	-6.99%	-1.11%	-5.40%

# Discount Rates (Public)

		2000	2001	2002	2003	2004	2005	2006	2007
Public Funds	ROA (ASOP 27)	8.50%	8.50%	8.50%	8.50%	8.00%	8.00%	8.00%	8.00%
Market Rates	10-Year TSY STRIP	5.30%	5.59%	4.34%	4.64%	4.49%	4.51%	4.97%	4.39%
<b>Valuation Error Estimate:</b>									
Public Fund	(10 Year Duration)	32%	29%	42%	39%	35%	35%	30%	36%
Public Fund	(15 Year Duration)	48%	44%	63%	59%	53%	53%	45%	54%

# Problem : Liability Valuation

## Single Discount Rate

**Not market interest rates**

*(ASOP = ROA, IRS = 4 year weighted average)*

**Present Value calculated annually/triennially**

*(Months delinquent)*

**Liability Term Structure not transparent**

*(Short, Intermediate, Long, Very Long)*

# Problem : Generic Indexes

Represent the market not client liability schedule

Client liability schedule is unique to each client (snowflakes)

Does **NOT** represent clients' true objective

*Confucius : Given Wrong Index ... Get Wrong Risk/Reward*

# Contributions

**A Future Asset**

**Will Fund Liabilities**

**Will Enhance Funded Ratio**

**Current Assets should Fund Net Liabilities**

# Asset Allocation

**Accounts for 95% of Total Return**

**Index Benchmark / Asset Manager(s) > 90%**

# **Tactical vs. Strategic Asset Allocation**

**Dynamic Objective = Dynamic Asset Allocation**

**Funded Ratio Dictates Asset Allocation**

**High Deficit  $\neq$  Low Deficit**

**Surplus  $\neq$  Deficit**

**Sports**

# Assets vs. Liabilities

## (Annual Returns)

Index	Weight	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99
Ryan Cash	5%	9.34	8.73	7.42	4.12	3.51	3.94	7.11	5.59	5.72	5.48	4.24
LB Aggregate	30%	14.53	8.96	16.00	7.40	9.75	-2.92	18.47	3.63	9.65	8.69	-0.82
S&P 500	60%	31.68	-3.15	30.45	7.64	10.07	1.29	37.57	22.93	33.34	28.55	21.03
MSCI EAFE	5%	10.80	-23.32	12.48	-11.85	32.95	8.06	11.56	6.37	2.08	20.24	27.32
Assets	100%	24.31	0.16	24.13	6.44	10.79	0.55	28.67	15.21	22.98	21.37	13.69
Ryan Liabilities	100%	25.40	3.23	19.26	7.87	22.46	-12.60	41.16	-3.70	19.63	16.23	-12.70
Assets – Liabilities		-1.12	-3.07	4.87	-1.43	-11.67	13.15	-12.49	18.91	3.35	5.14	26.39
Cumulative		-1.12	-4.98	0.13	-2.14	-21.89	-4.84	-16.06	29.15	43.97	68.28	166.66
Funded Ratio		0.99	0.96	1.00	0.99	.89	1.03	0.94	1.12	1.15	1.20	1.57

*% Weight = Static Asset Allocation for Each Asset Class*

*Source: Ryan ALM, Lehman Brothers, Standard & Poor's, Morgan Stanley*

# Assets vs. Liabilities

## (Annual Returns)

Index	Weight	'00	'01	'02	'03	'04	'05	'06	'07	08	'09
Ryan Cash	5%	6.49	4.97	1.75	1.04	1.25	3.09	4.92	5.28		
LB Aggregate	30%	11.63	8.44	10.25	4.10	4.34	2.43	4.34	6.96		
S&P 500	60%	-9.09	-11.86	-22.08	28.69	10.87	4.89	15.80	5.49		
MSCI EAFE	5%	-13.87	-21.11	-15.64	39.17	20.70	14.02	26.86	11.63		
Assets	100%	-2.50	-5.40	-11.41	20.04	8.92	4.43	12.25	6.36		
Ryan Liabilities	100%	25.96	3.08	19.47	1.96	9.35	8.87	0.81	10.99		
Assets - Liabilities		-28.46	-8.48	-30.89	18.08	-0.43	-4.44	11.44	-4.63		
Cumulative		78.66	42.98	-79.98	-13.48	-16.69	-40.08	18.47	-6.25		
Funded Ratio		1.21	1.11	0.83	0.97	0.97	0.93	1.03	0.99		

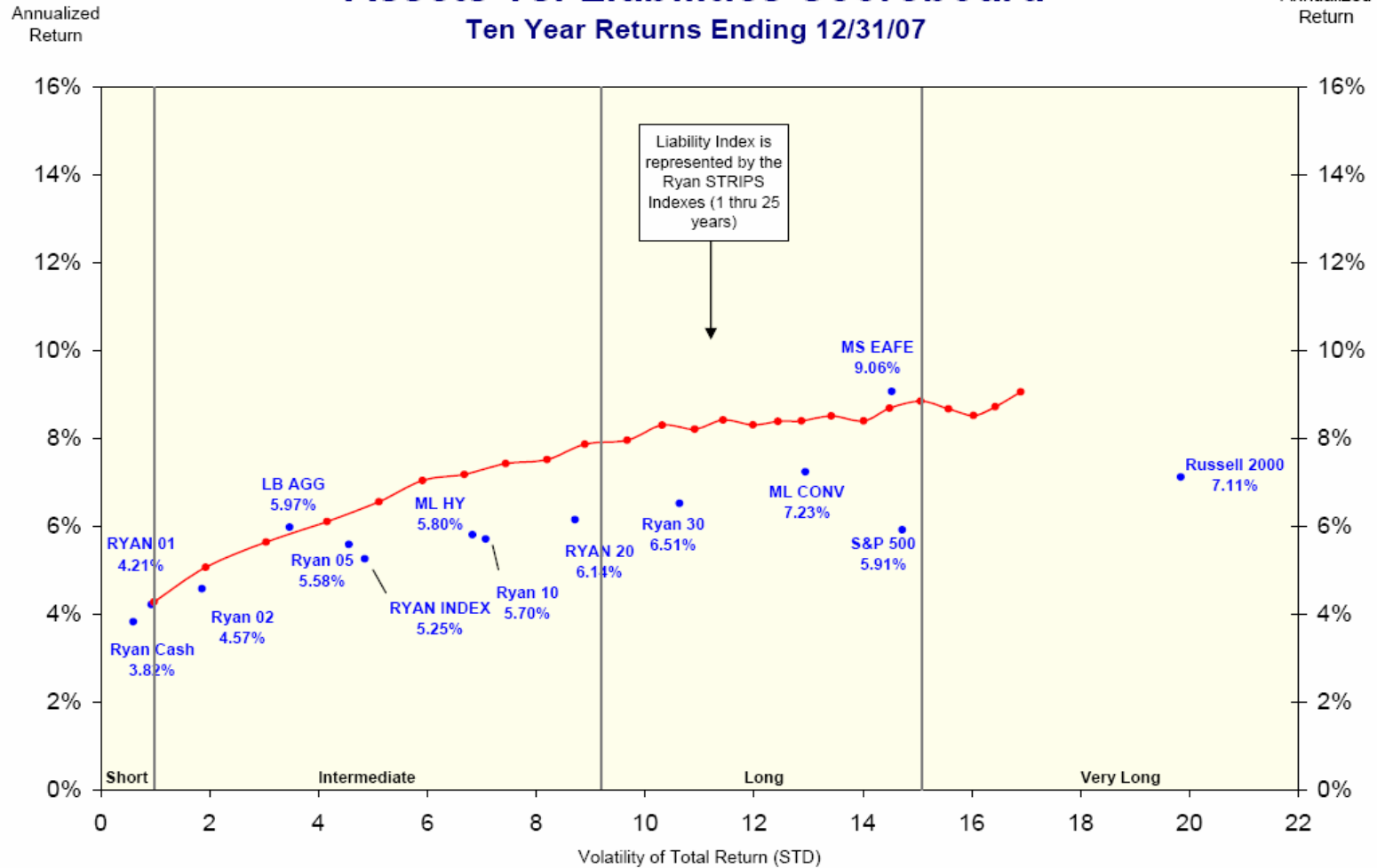
*% Weight = Static Asset Allocation for Each Asset Class*

*Source: Ryan ALM,, Lehman Brothers, Standard & Poor's, Morgan Stanley*

# Ryan ALM, Inc.

## Assets vs. Liabilities Scoreboard

### Ten Year Returns Ending 12/31/07

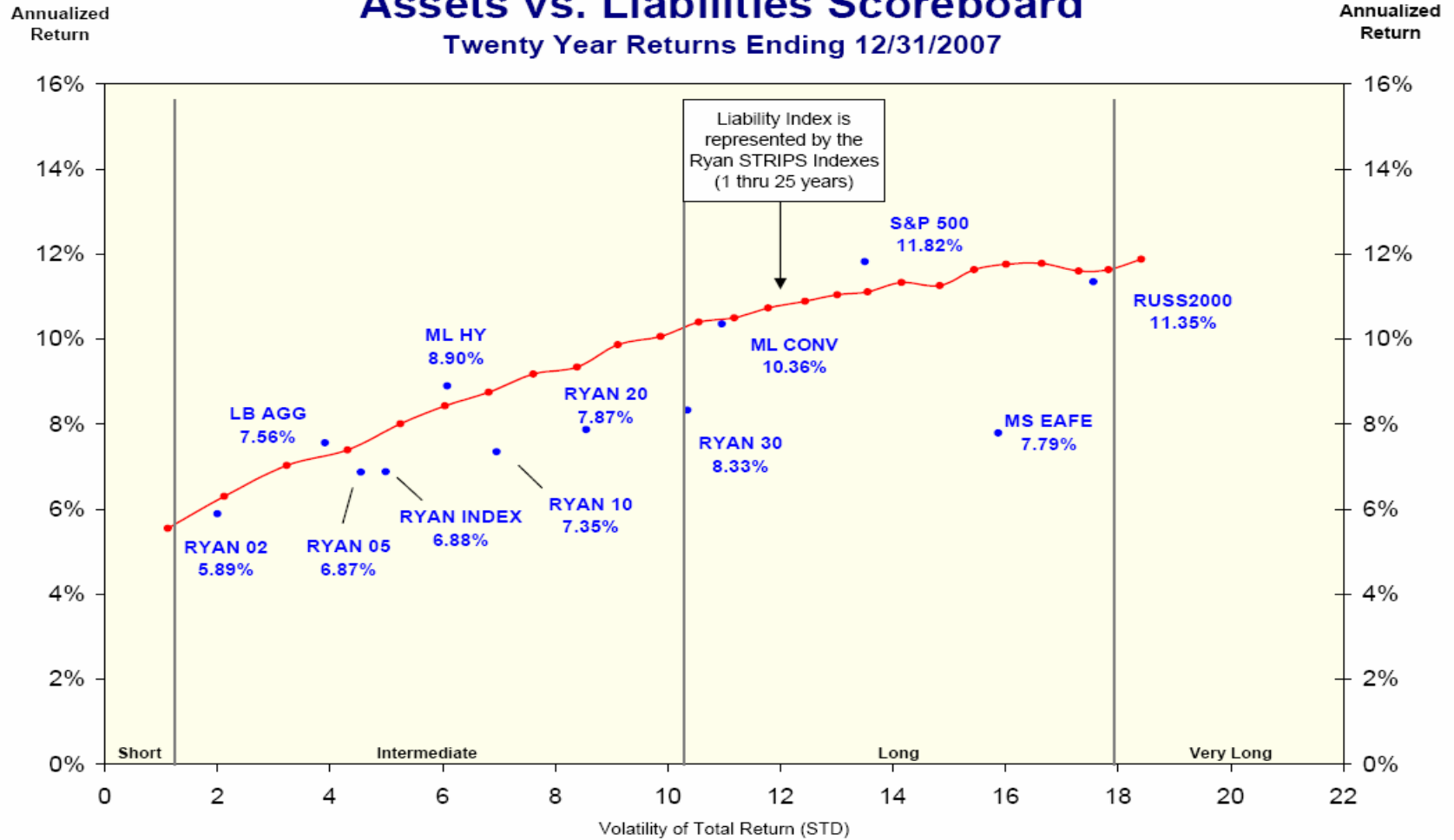


Sources: Ryan ALM, Standard & Poor's, Lehman Brothers, Merrill Lynch, Morgan Stanley, Frank Russell, CSFB/Tremont, Dow Jones.

# Ryan ALM, Inc.

## Assets vs. Liabilities Scoreboard

Twenty Year Returns Ending 12/31/2007



Sources: Ryan ALM, Standard & Poor's, Lehman Brothers, Merrill Lynch, Morgan Stanley, Frank Russell.  
 The information presented was compiled from sources believed to be reliable, and is furnished without responsibility for accuracy. Past performance does not guarantee future results.

# Society of Actuaries (SoA)

## (Principles Underlying Asset/Liability Management)

October 2004

Accounting measures *distort* economic reality

Consistent ALM can only be achieved for Financial Objectives

Entities that focus on economic value tend to achieve their financial objectives

Entities who manage their assets based on accounting treatment end up mismatching liabilities

*Translation : ALM Requires Economic Books*

# Custom Liability Index

Provide a Proper *Benchmark* for the Asset side to function efficiently

Asset Allocation  
Asset Management  
Performance Measurement

Create a set of *Economic Books* in harmony with SoA directive

Based on Market Value  
Built as a Liability Index series

# Portable Alpha

**Transfer (Port) Excess Returns above Objective Index**

**from Alpha Portfolio(s)  
to Beta Portfolio**

**Requires Custom Liability Index = Liability Objective**

**Should be *Dynamic* Process Monitored Frequently**

**Tactical Asset Allocation**

**Las Vegas**

# Beta Portfolio

**Matches Return of Objective**

**Pension Objective = Liability Driven**

**Beta = Asset / Liability Matched Portfolio**

**Beta = Liability Index Fund**

# NO Alpha in Bonds !

## Lehman Aggregate vs. Ryan STRIPS Index (periods ending 12/31/07)

	<u>20 yrs</u>	<u>10 yrs</u>
Lehman Aggregate	7.56%	5.97%
Ryan 5-year STRIPS	8.01	6.55
Difference	- 0.45	- 0.58

Duration of Lehman Agg consistently @ 5 years

# PSN STUDY

## Domestic Broad-Market Fixed Income (periods ending 09/30/06)

	<u>10 yrs</u>	<u>5 yrs</u>
1 <sup>st</sup> Quartile	6.75%	5.19%
Median	6.49	4.91
<b>Lehman Aggregate</b>	<b>6.42</b>	<b>4.81</b>

### Observations :

Difference between 1<sup>st</sup> Quartile and Median is small

Difference between Median and Lehman Agg is small

Returns are shown **Before Fees !**

**Median Manager Loses After Fees !!**

# Cash Flow

**No Generic Index has same Cash Flow as Clients Liabilities  
Lehman Aggregate  
(12/31/06)**

<b>1-3 years</b>	<b>24.58%</b>
<b>3-5 years</b>	<b>30.46</b>
<b>5-7 years</b>	<b>27.09</b>
<b>7-10 years</b>	<b>08.91</b>
<b>10+ years</b>	<b>08.96</b>

**Lehman Aggregate = 40% in Securitized instruments  
Cash flow behavior tends to move in wrong direction  
Rates go up = duration gets longer  
Cash flow gets reduced**

# Alpha

**Excess Return Above Objective**

**Pension Objective = Liability Driven**

**Alpha = Excess Return Above Liability Growth**

**Outperform Market Index, Lose to Liabilities ... Plan Loses!**

**To Measure Liability Alpha ... Requires a Custom Liability Index**

# True Alpha

**Requires CLI to Measure Liability Growth (Returns)**

<b>Actual Return of Alpha Portfolios</b>	<b>8.88%</b>
<b>- Actual Return of Liabilities</b>	<b>2.32%</b>
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<b>True Alpha</b>	<b>6.56%</b>

# **Portfolio Alpha (Benefits)**

**As Portable Alpha Transfers Excess Returns above Liability Index**

**Beta Portfolio grows ... creating 3 Major Benefits :**

- 1. Reduces Contribution Costs (Fully Funds Liabilities)**
- 2. Reduces Interest Rate Risks (Hedges Liabilities)**
- 3. Increases Funded Ratio (Plan Solvency)**