

**Ronald J. Ryan, CFA Testimony before
2006 ERISA Advisory Council
Working Group on a Prudent Investment Process
August 9, 2006**

I am honored to present my views on a prudent investment process that supports the objective of a pension plan. My expertise is mainly with defined benefit plans which is what I will address here.

Objective

Pension investment policy should be written and policed to best support the attainment of the pension objective. **The true objective of a defined benefit (DB) plan is to fund the liabilities at the lowest cost to the plan taking prudent risks.** Cost is defined as **contributions** or the extra payments made to fund liabilities.

Risk

The traditional definition of risk is volatility. Professor Bill Sharpe introduced this concept of risk in the 1960s suggesting that the lowest volatile asset (3-month T-Bill) would be the risk free asset. Most financial models today still use the Sharpe Ratio to measure the risk-adjusted returns of their assets. I had the pleasure to spend a day with this Nobel Prize winner back in 1994. I asked him what is the lowest risk asset for a liability driven objective. As a simple example, I used a single 10-year liability benefit payment. Professor Sharpe said that the 10-year zero-coupon Treasury STRIP would be the lowest risk asset that could match with certainty (no risk) this liability objective. He went on to say that the 3-month T-Bill would be a risky investment since it would have 39 reinvestment periods, 39 moments of uncertainty. Shortly after our meeting, he designed the new Sharpe Ratio (or Information Ratio) that best measures risk-adjusted returns versus any objective.

Pension risk is best defined as the return behavior and volatility of each asset class compared to the growth behavior and volatility of the liability objective it is funding. In order to measure pension risk, you must calculate the present value of ABO liabilities. Pension risk is best measured as the **Information Ratio versus liabilities** (Custom Liability Index). Bill Sharpe promotes this concept and ratio in his paper "The Sharpe Ratio"¹ suggesting that volatility alone is not the true measurement of risk. Given any index benchmark as the objective, the lowest risk asset is the asset that matches the index objective with certainty. Given the S&P 500 as the objective, then the S&P 500 as an index fund or ETF would be the low risk asset portfolio. The three-month T-Bill would be a high risk asset as its risk/reward behavior is very different (negative correlation) to the S&P 500 index behavior. Same is true for a liability objective. The low risk asset here would be the asset portfolio that most matches or correlates to the risk/reward behavior of the liabilities present value growth. **By definition, the low risk portfolio for a liability driven objective is a Liability Index Fund (i.e. the Liability Beta Portfolio).** This requires a Custom Liability Index to build and maintain such a low risk portfolio.

¹ William F. Sharpe, "The Sharpe Ratio", *The Journal of Portfolio Management*, Fall 1994

Present Value of Liabilities

There is much confusion as to how to discount the ABO cash flow schedule to ascertain an accurate measurement of the present value of these liabilities. The FASB, IRS, and ASOP 27 all have different views and rules on how to discount such pension liabilities with the differences as large as 49% versus a proper market value. Assuming that most pensions have a 10-year to 15-year average duration on their liabilities, let’s compare the discount rate of these rules to the yields of 10 and 15-year Treasury STRIPS (the bonds used to defease liabilities) :

**Table 1
Discount Rate Comparisons**

Discount Rate Differences			2002	2003	2004	2005
FASB (Moody’s Long AA Corporates)			6.52	6.02	5.66	5.22
IRS (Weighted Average of Corporates)			7.10	6.50	6.10	5.70
ASOP 27 (Forecasted ROA)			8.50	8.50	8.00	8.00
10-year Treasury STRIPS			4.34	4.64	4.49	4.51
15-year Treasury STRIPS			5.09	5.32	4.97	4.67
Valuation Differences (%)			2002	2003	2004	2005
FASB	versus	10-year Treasury STRIPS	21.80	13.80	11.70	7.10
		15-year Treasury STRIPS	21.45	10.50	10.35	8.25
IRS	versus	10-year Treasury STRIPS	27.60	18.60	16.10	11.90
		15-year Treasury STRIPS	30.15	17.70	16.95	15.45
ASOP 27	vs.	10-year Treasury STRIPS	41.60	38.60	35.10	34.90
		15-year Treasury STRIPS	51.15	47.70	45.45	49.95

This discount rate jabberwocky basically “undervalued” liabilities making the funded ratio appear more solvent than the economic reality. This led many plan sponsors (especially multi-employer and Public Plans under ASOP 27, since their valuation of liabilities was the most skewed) to make inappropriate contribution decisions, inappropriate benefit decisions and inappropriate asset allocation decisions. Fortunately, the SoA (Society of Actuaries) in their October 2004 white paper “Principles Underlying Asset Liability Management”² made it clear that until pension plans create a set of “**economic books**” (market value) assets can not be managed effectively versus the liability valuations currently used. The SoA emphasized that these current rules distort the real economic reality and mislead assets on the true funded ratio. Moreover, the SoA cited that a consistent ALM structure can only be achieved for economic objectives. Entities that focus on economic values tend to achieve their financial objectives while entities that focus on accounting values usually fail.

Economic Books (Custom Liability Index)

Pension investment policy should state clearly that the market value of assets must be compared to the market value of liabilities on a transparent and frequent basis (quarterly or monthly) instead of the current system where liabilities are reported usually annually with months delinquency. Can you imagine the S&P 500 being delivered annually, months in arrears, and they don’t show you the portfolio. No equity manager could manage assets properly to this mysterious index. Well, welcome to pension land where the present value or market value of liabilities is seldom seen. To correct this

² Society of Actuaries, “Principles Underlying Asset Liability Management”, III A, October 12, 2004

situation one must establish a Custom Liability Index or a set of economic books that calculates the market value of liabilities accurately and frequently. Once the objective is clearly monitored as a Custom Liability Index, the asset side can now function effectively. This objective index benchmark will play a major role in all decisions affecting the management and monitoring of assets. Pension plan cash flow schedules are like snowflakes ... you never find two alike. Until the liability present value is calculated and monitored as a Custom Liability Index, the asset side has a difficult time understanding the true size, shape and risk/reward behavior of each plan sponsor's unique benefit payment schedule. **It is critical that investment policy require the establishment of a Custom Liability Index for each pension plan as the best representation of the true objective.** Sample pages of a Custom Liability Index are attached in the Appendix of this testimony.

Asset Allocation

The intent of asset allocation is to create a synergy among asset classes that meets the client objective with prudent risk. This is still ideal. What is missing is the client objective as a custom index and the discipline to shift funds to a less risky allocation when you win the game (surplus). The funded ratio should play a major role in the asset allocation decision. Logic would suggest that a plan with a surplus should have a radically different asset allocation than a plan with a large deficit. As such, asset allocation should be dynamic or *tactical* based upon the financial health (funded ratio) of the plan. Static or *strategic* asset allocations are not in the best interests of the plan. Just like in sports, you change your strategy based on the relative score versus your opponent. The team that is ahead by 30 points behaves differently than the team that is behind by 30 points.

This funded ratio is calculated as the present value (market value) of plan assets versus the present value of the ABO liabilities. To measure the funded ratio, it is essential that the market value of liabilities is accurate and timely. With a set of economic books (Custom Liability Index), the pension plan can now monitor accurately the progress in enhancing the financial health of the plan and in reducing contribution costs through the accurate calculation of the economic funded ratio. Asset allocation can now be adjusted properly and timely to enhance or secure the funded ratio of the plan. **Investment policy should require the reporting of the economic funded ratio whenever performance measurement is reported on assets (i.e. monthly or quarterly).**

Asset allocation should divide assets into two categories: Beta and Alpha. Beta is defined as the single portfolio that matches the objective (liabilities) with some certainty. Since most objectives are defined by an index benchmark, Beta is an index fund by definition. Alpha is the excess return above the objective. Since the pension objective is liability driven, Beta must be a Liability Index Fund and Alpha must be the excess return above liability growth and not the excess return above a generic market index. Based upon the funded ratio and the size of the deficit or surplus, asset allocation has to decide how to allocate between the Beta assets and the Alpha assets. Logically, the lower the funded ratio, the higher the deficit and the higher the allocation to Alpha portfolios.

There are basically four ways to cure a pension deficit :

1. **Alpha portfolios** outgrow liability present value sufficiently
2. **Liabilities** go down in present value due to higher discount rates
3. Increase in **Contributions**
4. All of the above

The quest in pensions should be to fund the liabilities at the lowest cost to the plan sponsor while reducing risk over a long-term horizon. **The pension quest should be ... to grow the Liability Beta portfolio!** As the funded ratio improves (due to any of the four deficit cures), asset allocation needs to port or transfer Alpha (excess returns) to the Beta portfolio, a true tactical asset allocation based upon true economic values. **Investment policy should police asset allocation by monitoring the asset allocation between the Beta and Alpha asset classes based upon the economic funded ratio.**

Beta

If the pension objective is liability driven, then **Beta for pensions must be the portfolio that matches the cash flow schedule of pensions.** This is better described and managed as a **Liability Index Fund.** Unlike immunization, which was focused on matching just the average duration of the liabilities, the Beta portfolio (i.e. Liability Index Fund) must match each liability payment; it must maintain the same yield curve shape or term structure. Since contributions and the funded ratio are based on present value calculations, it is essential that the Liability Beta portfolio match the interest rate sensitivity of the liabilities that it is funding. This requires a Custom Liability Index to provide the present value weights or term structure so the Beta portfolio can be correctly modeled. Moreover, the Custom Liability Index provides daily liability growth calculations so the Beta portfolio can be constantly monitored to ensure that it is on track (matched portfolio).

This Beta portfolio is where the investment grade bonds should be allocated. The best fit or match to liabilities would be zero-coupon bonds. Coupon bond durations are a function of interest rates and currently peak out around 16 years so only zero-coupon bonds can be used to fund or match liabilities longer than 16 years. Mortgage-backed securities should never be used to match liabilities due to their negative convexity and uncertain cash flows.

I designed most of the Lehman bond indexes as their former Director of Research in the 1970's and early 1980's. These indexes are the best representation of the investment grade bond markets but they have nothing to do with liabilities. Generic market indexes help you understand the risk/reward behavior of a specific market or asset class but have no relationship to the unique liability structure of a pension plan. Again, pension liabilities are like snowflakes, no two are alike. Each pension has a distinct labor force with different mortality, salary structure, plan amendments, etc.... The duration and term structure of a pension is unique to the plan; you will never find a generic index with such a structure. Generic indexes may, in fact, force you into a contradictory growth rate and volatility behavior to that of liabilities. The Lehman Aggregate should behave like its average duration (@ 4.5 to 5 years) suggesting its cash flow schedule looks nothing like most pension plans whose average liability durations are 10 to 15 years. As of December 31, 2005 Lehman published the following cash flow structure of its Aggregate index:

Table 2
Lehman Aggregate Cash Flow Structure
(12/31/05)

1 - 3 years	=	21.00%
3 - 5 years	=	21.74
5 - 7 years	=	15.33
7 - 10 years	=	29.48
10 + years	=	12.46

Hard to believe that any pension fund has a liability term structure this heavily skewed to very short payment dates, with over 42% due in five years and 21% due in less than three years. The Lehman Aggregate is not a good proxy or index benchmark to represent pension liabilities.

Although heavily weighted to non-Treasury securities, the Lehman Aggregate has underperformed the 5-year Ryan STRIPS Index by 12 basis points annually for the last 10 years and by 46 basis points annually for the last 20 years with a tracking error of 41 basis points per month (i.e. does not track STRIPS or liabilities well) :

Table 3
Comparison of Lehman Aggregate versus Ryan 5-year Strips Index

	11/30/95 to 11/30/05	11/30/85 to 11/30/05
	<u>Annual Return</u>	<u>Annual Return</u>
Lehman Aggregate	6.21%	8.00
Ryan 5 year STRIPS	6.33	8.46
Difference	- 0.12	- 0.46

This supports the fact and research of Ryan ALM that there is no or little Alpha in bonds.³ **The value of an investment grade bond portfolio is ... Beta not Alpha.** Bonds are best as the matching portfolio versus a liability driven objective. However, in order to qualify as a proper Beta portfolio this bond portfolio must match the unique term structure of each client’s liability cash flow schedule and never that of a generic market index like the Lehman Aggregate. This Beta bond portfolio should be zero-coupon dominate. **Investment policy should require that only bonds matched to liabilities can be used as the Beta portfolio.**

Alpha

Alpha needs to be redefined as the excess return above the client’s true objective

(i.e. liabilities). Based upon a Custom Liability Index, Alpha is the excess return of asset growth above liability growth. Since liabilities are bond-like, in order to earn Alpha these portfolios should be primarily, if not exclusively, non-bond assets (exception: high yield bonds since they are more equity-like in their behavior). Each non-bond asset class is an Alpha portfolio. The asst allocation is Alpha is based upon the size of the deficit and the true economic funded ratio. Such an asset allocation decision is made with a high probability that the Alpha portfolios will meet the target ROA and provide a fully funded plan over a time horizon equal to the average duration of the liability schedule. Non-traditional assets (i.e. alternative investments) make sense for some of the Alpha portfolios as long as Alpha is monitored versus liabilities. **Investment policy should require the calculation of Alpha as the growth in the Alpha portfolios versus the growth in liabilities they are funding separate and distinct from the Beta portfolios. Investment policy should consider that performance fees should be based on true economic Alpha versus liabilities and not outperforming a hurdle rate or index that has nothing to do with true Alpha.**

³ Ronald J. Ryan, “No Alpha in Bonds”, www.Ryan ALM.com, January 27, 2006

Asset Management

Investment policy should allow for investment styles that are in the best interests of the plan achieving its objective and restrict investment strategies that endanger the achievement of the objective. Since the objective is to fund liabilities at low cost with prudent risk, there should be recognition of this in investment policy. As Professor Bill Sharpe admitted, the lowest risk portfolio for any objective is an index fund that matches the objective with some certainty. Index funds are very popular in America but Liability Index Funds are rare. This requires a Custom Liability Index. Investment policy should permit and encourage the use of Liability Index Funds as the core portfolio or Beta portfolio. As the funded ratio improves there should be a shift in asset allocation to reduce risk by allocating more to a liability Beta portfolio. **Investment policy should recognize the status of the funded ratio and reduce risk as the funded ratio gets closer to full funding.**

Performance Measurement

Most pension funds are consumed by the quest for Alpha or the excess return above an index benchmark. Unfortunately, the finance industry is brainwashed into using the wrong benchmarks for liability driven objectives. As Confucius and a proper Fiduciary must have once said :

Given the wrong benchmark index ... you will get the wrong risk/reward !

How true these words now haunt pension funds and other liability driven objectives. The objective of a pension is to fund the liabilities at the lowest cost to the plan taking prudent risks. It follows that if you outperform any generic index (i.e. S&P 500) but lose to liabilities ... **you lose!** The correction period of 2000 – 2002 for equities was a frightening example of the disconnect and risk between the S&P 500 and liabilities. In those three years, liabilities outgrew the S&P 500 by 92% to 101% using the Ryan Liability Index and the Ryan 15 and 20-year STRIPS Indexes. Based upon the 21 year history of STRIPS Indexes, the S&P 500 consistently behaves (volatility) like a 15 to 20 year STRIPS:

Table 4
Absolute Total Return Comparisons

<u>Index</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>Cumulative</u>
S&P 500	-9.09	-11.86	-22.08	- 37.57%
Ryan Liability Index	25.96	3.08	19.47	55.12
Ryan 15 year STRIPS	28.24	1.22	24.04	61.01
Ryan 20 year STRIPS	32.54	0.66	22.77	63.79

Just like the scoreboard in sports regulates your strategy, so should the pension scoreboard. If you are way behind (deficit) you will behave differently than if you are way ahead (surplus). Without a Custom Liability Index, you can't understand the score, you can't measure Alpha and ... you can't play the pension game efficiently.

The two graphs attached to the Appendix titled Assets vs. Liabilities show the return and volatility behavior of several asset classes (dots) versus Liabilities measured by the Ryan Liability Index (line) over 20 years and 10 years ending 12/31/05. First impression on both graphs shows that equities (S&P 500) outperform bonds (Lehman Aggregate) by 300 to 400 bps per year. Second impression shows that bonds are above the liability line and equities are below or on the line. Why would you compare these two asset classes versus each other? Each asset class should always be compared to the true objective

(i.e. liabilities) to understand the economic risk/reward of each asset class. As the two graphs show clearly, the S&P 500 behaves like a long liability (around 20-years). Believe it or not, a 20-year Treasury STRIP (i.e. 20-year liability) has outperformed the S&P 500 over the last 20-years.

Table 5
Assets vs. Liabilities Scoreboard
(periods ending 12/31/05)

	20 years	10 years
Lehman Aggregate	7.88%	6.16%
S&P 500	11.93	9.07
Ryan 20-year STRIP	12.67	9.60

Pension investment policy should require the comparison of total asset growth versus total liability growth every performance measurement period (i.e. monthly or quarterly) as well as by each asset class. A key performance measurement calculation is the Information Ratio. This ratio compares the return and volatility behavior of the asset class to the return and volatility behavior of the objective. This should be a required statistic on all performance measurement reports.

Insurance Company Model

Pension investment policy should be designed and enforced similar to the way Life Insurance companies are regulated. This would require pension assets to be managed in a way that is in the best interests of the true objective of the pension plan. Stringent insurance regulations require an **ALM focus using bonds as the matching or funding asset. Any surplus is usually isolated as a distinct portfolio with a distinct objective (target growth rate) managed as an asset allocation of non-bonds. Escrow funds are also created for contingencies or errors that may arise.** In pension land, escrow funds could be established for mortality and inflation errors since they are so hard to estimate with any precision over long horizons.

The way you react to adversity is the key to success.

Tom Landry

Appendix

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Ryan ALM, Inc
AAA Client with Contributions (STRIP YC) - Structure
6/30/2006



Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	0.32	12	4,243,248	4,138,804	0.00	97.560	4.969	0.485
01.01 - 02.50	0.71	18	10,155,374	9,263,978	0.00	91.269	5.170	1.749
02.50 - 03.50	0.65	12	9,900,529	8,488,792	0.00	85.758	5.124	2.963
03.50 - 04.50	0.86	12	13,782,723	11,271,295	0.00	81.793	5.045	3.937
04.50 - 05.50	1.13	12	18,980,415	14,814,504	0.00	78.067	4.980	4.914
05.50 - 06.50	1.49	12	26,516,580	19,568,468	0.00	73.816	5.092	5.889
06.50 - 07.50	1.87	12	34,934,037	24,503,298	0.00	70.157	5.112	6.849
07.50 - 08.50	2.20	12	43,387,401	28,754,417	0.00	66.291	5.192	7.819
08.50 - 09.50	2.56	12	53,373,945	33,480,943	0.00	62.744	5.235	8.791
09.50 - 10.50	2.94	12	64,858,181	38,518,036	0.00	59.403	5.267	9.762
INTER(1- 10.50)	14.40	114	275,889,184	188,663,732	0.00	69.491	5.165	7.086
10.50 - 11.50	3.32	12	77,372,454	43,459,849	0.00	56.185	5.303	10.732
11.50 - 12.50	3.63	12	89,728,144	47,590,844	0.00	53.053	5.348	11.700
12.50 - 13.50	3.90	12	101,919,274	51,021,705	0.00	50.074	5.388	12.670
13.50 - 14.50	4.15	12	114,980,411	54,415,110	0.00	47.337	5.411	13.642
14.50 - 15.50	4.42	12	128,884,151	57,870,477	0.00	44.912	5.405	14.615
15.50 - 16.50	4.67	12	143,547,961	61,223,958	0.00	42.661	5.393	15.589
16.50 - 17.50	4.88	12	157,688,363	63,868,082	0.00	40.512	5.385	16.561
17.50 - 18.50	5.01	12	170,955,130	65,597,424	0.00	38.380	5.390	17.533
18.50 - 19.50	5.14	12	184,639,712	67,316,519	0.00	36.466	5.379	18.508
19.50 - 20.50	5.27	12	198,587,696	68,982,423	0.00	34.743	5.356	19.484
LONG(10.5 - 20.5)	44.38	120	1,368,303,295	581,346,391	0.00	43.459	5.378	15.499
20.50 - 21.51	5.37	12	212,627,319	70,402,976	0.00	33.117	5.332	20.460
21.50 - 22.50	5.46	12	225,480,929	71,465,898	0.00	31.700	5.290	21.436
22.50 - 23.50	5.46	12	237,077,618	71,529,208	0.00	30.177	5.277	22.412
23.50 - 24.50	5.53	12	248,740,095	72,407,619	0.00	29.114	5.208	23.394
24.50 - 25.50	5.51	12	260,444,490	72,205,754	0.00	27.730	5.197	24.369
25.50 - 26.50	5.48	12	272,351,438	71,730,866	0.00	26.343	5.197	25.343
26.50 - 27.50	5.43	12	284,393,927	71,157,362	0.00	25.026	5.197	26.318
27.50 - 28.50	2.67	6	145,207,586	34,966,955	0.00	24.082	5.197	27.047
28.50 - 29.50	0.00	0	0	0	0.00	0.000	0.000	0.000
29.50 - 30.50	0.00	0	0	0	0.00	0.000	0.000	0.000
VLONG(20.5+)	40.91	90	1,886,323,403	535,866,639	0.00	28.698	5.239	23.635
Total	100.00	336	3,534,759,130	1,310,015,566	0.00	41.341	5.289	17.568



Ryan ALM, Inc
AAA Client (STRIP YC) - Performance

6/30/2006



Without Contributions

With Contributions

Difference

Duration	Without Contributions					With Contributions					Difference			
	% Weight	Day	Month	Year	Index Level	% Weight	Day	Month	Year	Index Level	% Weight	Day	Month	Year
SHORT(0-1)	2.75	0.03	0.38	1.97	104.79	0.32	0.03	0.38	1.96	104.80	2.44	-0.00	0.00	0.01
01.01 - 02.50	4.21	0.09	0.17	0.98	102.71	0.71	0.09	0.17	0.94	102.63	3.50	-0.00	0.01	0.04
02.50 - 03.50	2.85	0.17	0.14	0.17	101.09	0.65	0.18	0.14	0.15	101.07	2.20	-0.00	0.00	0.02
03.50 - 04.50	2.92	0.24	0.09	-0.68	100.05	0.86	0.24	0.09	-0.70	100.03	2.06	-0.00	0.00	0.02
04.50 - 05.50	3.00	0.32	0.12	-1.09	100.26	1.13	0.32	0.12	-1.09	100.28	1.87	-0.00	0.00	0.00
05.50 - 06.50	3.08	0.38	0.15	-1.66	100.74	1.49	0.38	0.15	-1.68	100.73	1.59	-0.00	-0.00	0.02
06.50 - 07.50	3.18	0.49	0.35	-2.05	100.61	1.87	0.49	0.35	-2.05	100.62	1.31	-0.00	-0.00	-0.00
07.50 - 08.50	3.26	0.50	0.31	-2.82	100.20	2.19	0.50	0.31	-2.83	100.19	1.06	0.00	0.00	0.01
08.50 - 09.50	3.35	0.49	0.23	-3.80	99.78	2.56	0.49	0.24	-3.81	99.78	0.79	-0.00	-0.00	0.01
09.50 - 10.50	3.44	0.62	0.41	-4.37	100.23	2.94	0.62	0.41	-4.37	100.23	0.50	0.00	-0.00	0.00
INTER(1- 10.50)	29.29	0.36	0.22	-1.71	100.69	14.40	0.44	0.26	-2.57	100.43	14.88	-0.08	-0.04	0.86
10.50 - 11.50	3.52	0.69	0.55	-4.86	100.41	3.32	0.69	0.55	-4.86	100.41	0.20	-0.00	0.00	0.01
11.50 - 12.50	3.59	0.66	0.56	-5.65	100.74	3.63	0.66	0.56	-5.66	100.74	-0.04	0.00	-0.00	0.00
12.50 - 13.50	3.65	0.70	0.64	-6.42	100.89	3.89	0.71	0.64	-6.42	100.89	-0.25	-0.00	0.00	0.00
13.50 - 14.50	3.70	0.87	0.81	-7.12	101.27	4.15	0.87	0.81	-7.13	101.27	-0.45	-0.00	-0.00	0.00
14.50 - 15.50	3.76	1.04	1.10	-7.71	101.59	4.42	1.04	1.11	-7.71	101.59	-0.65	-0.00	-0.00	0.00
15.50 - 16.50	3.82	1.25	1.27	-8.13	102.28	4.67	1.25	1.27	-8.13	102.28	-0.85	-0.00	-0.00	0.00
16.50 - 17.50	3.87	1.30	1.54	-8.54	102.90	4.88	1.30	1.54	-8.54	102.90	-1.00	0.00	-0.00	0.00
17.50 - 18.50	3.90	1.17	1.46	-9.21	103.01	5.01	1.17	1.46	-9.21	103.01	-1.10	-0.00	-0.00	0.00
18.50 - 19.50	3.94	1.24	1.49	-9.75	103.01	5.14	1.24	1.49	-9.75	103.01	-1.20	-0.00	-0.00	0.00
19.50 - 20.50	3.97	1.32	1.45	-10.07	103.25	5.27	1.32	1.45	-10.07	103.25	-1.30	-0.00	0.00	-0.00
LONG(10.5 - 20.5)	37.72	1.03	1.10	-7.84	101.98	44.38	1.06	1.14	-8.02	102.15	-6.65	-0.03	-0.04	0.18
20.50 - 21.51	3.99	1.45	1.66	-10.71	103.54	5.37	1.45	1.66	-10.71	103.54	-1.38	-0.00	-0.00	0.00
21.50 - 22.50	4.03	1.57	1.86	-10.78	104.09	5.46	1.57	1.86	-10.78	104.09	-1.43	0.00	0.00	0.00
22.50 - 23.50	4.03	1.35	1.95	-11.20	104.34	5.46	1.35	1.95	-11.20	104.34	-1.43	0.00	-0.00	-0.00
23.50 - 24.50	4.08	1.70	2.21	-11.38	104.35	5.53	1.70	2.21	-11.38	104.35	-1.44	0.00	0.00	0.00
24.50 - 25.50	4.07	1.91	2.47	-11.65	105.40	5.51	1.91	2.47	-11.65	105.40	-1.44	0.00	0.00	-0.00
25.50 - 26.50	4.05	1.98	2.55	-12.17	105.53	5.48	1.99	2.55	-12.17	105.53	-1.43	-0.00	-0.00	0.00
26.50 - 27.50	4.01	2.06	2.64	-12.69	105.46	5.43	2.06	2.64	-12.69	105.46	-1.42	-0.00	-0.00	0.00
27.50 - 28.50	1.97	2.12	2.70	-13.16	105.45	2.67	2.12	2.70	-13.16	105.45	-0.70	0.00	0.00	0.00
28.50 - 29.50	0.00	0.00	0.00	0.00	116.44	0.00	0.00	0.00	0.00	116.44	0.00	0.00	0.00	0.00
29.50 - 30.50	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
VLONG(20.5+)	30.24	1.74	2.23	-11.70	105.05	40.91	1.74	2.23	-11.70	105.06	-10.67	-0.00	-0.00	0.00
Total	100.00	1.02	1.16	-7.21	102.93	100.00	1.25	1.46	-8.93	103.63	0.00	-0.22	-0.30	1.73



Ryan ALM, Inc
AAA Client with Contributions (STRIP YC)
Sensitivity Report (Total Return - Based on Interest Rate Moves over 12 Month Horizon)
6/30/2006



Duration	% Portfolio	Par Value	Market Value	YTW	MDur	100	50	-50	-100
SHORT(0-1)	0.32	4,243,248	4,138,804	4.969	0.485	0.00	0.00	0.00	0.00
01.01 - 02.50	0.71	10,155,374	9,263,978	5.170	1.749	4.43	4.83	5.64	6.06
02.50 - 03.50	0.65	9,900,529	8,488,792	5.124	2.963	3.13	4.15	6.24	7.31
03.50 - 04.50	0.86	13,782,723	11,271,295	5.045	3.937	2.05	3.57	6.68	8.28
04.50 - 05.50	1.13	18,980,415	14,814,504	4.980	4.914	1.00	3.00	7.13	9.27
05.50 - 06.50	1.49	26,516,580	19,568,468	5.092	5.889	0.13	2.61	7.78	10.47
06.50 - 07.50	1.87	34,934,037	24,503,298	5.112	6.849	-0.81	2.14	8.32	11.56
07.50 - 08.50	2.20	43,387,401	28,754,417	5.192	7.819	-1.69	1.72	8.93	12.74
08.50 - 09.50	2.56	53,373,945	33,480,943	5.235	8.791	-2.60	1.27	9.51	13.89
09.50 - 10.50	2.94	64,858,181	38,518,036	5.267	9.762	-3.50	0.81	10.07	15.04
INTER(1- 10.50)	14.40	275,889,184	188,663,732	5.165	7.086	-0.97	2.07	8.51	11.91
10.50 - 11.50	3.32	77,372,454	43,459,849	5.303	10.732	-4.40	0.36	10.65	16.20
11.50 - 12.50	3.63	89,728,144	47,590,844	5.348	11.700	-5.28	-0.08	11.23	17.39
12.50 - 13.50	3.90	101,919,274	51,021,705	5.388	12.670	-6.15	-0.52	11.82	18.58
13.50 - 14.50	4.15	114,980,411	54,415,110	5.411	13.642	-7.04	-0.98	12.39	19.77
14.50 - 15.50	4.42	128,884,151	57,870,477	5.405	14.615	-7.94	-1.47	12.93	20.94
15.50 - 16.50	4.67	143,547,961	61,223,958	5.393	15.589	-8.84	-1.96	13.47	22.11
16.50 - 17.50	4.88	157,688,363	63,868,082	5.385	16.561	-9.73	-2.44	14.02	23.29
17.50 - 18.50	5.01	170,955,130	65,597,424	5.390	17.533	-10.60	-2.91	14.58	24.51
18.50 - 19.50	5.14	184,639,712	67,316,519	5.379	18.508	-11.47	-3.39	15.13	25.72
19.50 - 20.50	5.27	198,587,696	68,982,423	5.356	19.484	-12.35	-3.88	15.66	26.92
LONG(10.5 - 20.5)	44.38	1,368,303,295	581,346,391	5.378	15.499	-8.74	-1.92	13.41	22.02
20.50 - 21.51	5.37	212,627,319	70,402,976	5.332	20.460	-13.22	-4.37	16.20	28.14
21.50 - 22.50	5.46	225,480,929	71,465,898	5.290	21.436	-14.09	-4.87	16.73	29.35
22.50 - 23.50	5.46	237,077,618	71,529,208	5.277	22.412	-14.94	-5.35	17.28	30.60
23.50 - 24.50	5.53	248,740,095	72,407,619	5.208	23.394	-15.82	-5.88	17.78	31.81
24.50 - 25.50	5.51	260,444,490	72,205,754	5.197	24.369	-16.65	-6.34	18.34	33.08
25.50 - 26.50	5.48	272,351,438	71,730,866	5.197	25.343	-17.45	-6.80	18.92	34.39
26.50 - 27.50	5.43	284,393,927	71,157,362	5.197	26.318	-18.25	-7.25	19.50	35.71
27.50 - 28.50	2.67	145,207,586	34,966,955	5.197	27.047	-18.84	-7.59	19.94	36.71
28.50 - 29.50	0.00	0	0	0.000	0.000	0.00	0.00	0.00	0.00
29.50 - 30.50	0.00	0	0	0.000	0.000	0.00	0.00	0.00	0.00
VLONG(20.5+)	40.91	1,886,323,403	535,866,639	5.239	23.635	-15.98	-5.95	17.96	32.19
Total	100.00	3,534,759,130	1,310,015,566	5.289	17.568	-10.59	-3.00	14.57	24.74



Ryan ALM, Inc
AAA Client with Contributions (STRIP YC)
Sensitivity Report (Market Value Change - Based on Interest Rate Moves over 12 Month Horizon)
6/30/2006



Duration	% Portfolio	Par Value	Market Value	YTW	MDur	100	50	-50	-100
SHORT(0-1)	0.32	4,243,248	4,138,804	4.969	0.485	0	0	0	0
01.01 - 02.50	0.71	10,155,374	9,263,978	5.170	1.749	9,673,911	9,711,285	9,786,860	9,825,038
02.50 - 03.50	0.65	9,900,529	8,488,792	5.124	2.963	8,754,066	8,841,182	9,018,702	9,109,152
03.50 - 04.50	0.86	13,782,723	11,271,295	5.045	3.937	11,502,189	11,673,129	12,024,089	12,204,175
04.50 - 05.50	1.13	18,980,415	14,814,504	4.980	4.914	14,962,013	15,258,431	15,871,325	16,188,162
05.50 - 06.50	1.49	26,516,580	19,568,468	5.092	5.889	19,593,303	20,078,740	21,090,123	21,616,753
06.50 - 07.50	1.87	34,934,037	24,503,298	5.112	6.849	24,305,177	25,026,786	26,540,941	27,335,023
07.50 - 08.50	2.20	43,387,401	28,754,417	5.192	7.819	28,269,119	29,249,566	31,321,819	32,416,486
08.50 - 09.50	2.56	53,373,945	33,480,943	5.235	8.791	32,611,859	33,906,740	36,663,629	38,130,549
09.50 - 10.50	2.94	64,858,181	38,518,036	5.267	9.762	37,168,193	38,831,500	42,398,487	44,310,375
INTER(1- 10.50)	14.40	275,889,184	188,663,732	5.165	7.086	186,839,830	192,577,359	204,715,975	211,135,713
10.50 - 11.50	3.32	77,372,454	43,459,849	5.303	10.732	41,547,528	43,617,019	48,087,737	50,501,350
11.50 - 12.50	3.63	89,728,144	47,590,844	5.348	11.700	45,079,374	47,553,374	52,937,541	55,865,117
12.50 - 13.50	3.90	101,919,274	51,021,705	5.388	12.670	47,881,999	50,754,735	57,052,397	60,501,587
13.50 - 14.50	4.15	114,980,411	54,415,110	5.411	13.642	50,585,051	53,880,381	61,157,164	65,171,769
14.50 - 15.50	4.42	128,884,151	57,870,477	5.405	14.615	53,274,618	57,021,002	65,354,866	69,985,942
15.50 - 16.50	4.67	143,547,961	61,223,958	5.393	15.589	55,810,681	60,025,890	69,472,023	74,759,183
16.50 - 17.50	4.88	157,688,363	63,868,082	5.385	16.561	57,654,468	62,309,402	72,819,437	78,744,446
17.50 - 18.50	5.01	170,955,130	65,597,424	5.390	17.533	58,647,111	63,690,208	75,160,573	81,673,544
18.50 - 19.50	5.14	184,639,712	67,316,519	5.379	18.508	59,595,148	65,035,132	77,499,263	84,628,120
19.50 - 20.50	5.27	198,587,696	68,982,423	5.356	19.484	60,464,419	66,305,187	79,787,356	87,554,005
LONG(10.5 - 20.5)	44.38	1,368,303,295	581,346,391	5.378	15.499	530,540,397	570,192,330	659,328,357	709,385,063
20.50 - 21.51	5.37	212,627,319	70,402,976	5.332	20.460	61,097,503	67,326,094	81,810,632	90,214,834
21.50 - 22.50	5.46	225,480,929	71,465,898	5.290	21.436	61,394,675	67,982,831	83,419,313	92,440,240
22.50 - 23.50	5.46	237,077,618	71,529,208	5.277	22.412	60,846,217	67,703,428	83,890,869	93,419,395
23.50 - 24.50	5.53	248,740,095	72,407,619	5.208	23.394	60,951,435	68,153,694	85,281,544	95,437,132
24.50 - 25.50	5.51	260,444,490	72,205,754	5.197	24.369	60,186,842	67,625,955	85,450,258	96,094,912
25.50 - 26.50	5.48	272,351,438	71,730,866	5.197	25.343	59,212,594	66,855,585	85,303,992	96,400,711
26.50 - 27.50	5.43	284,393,927	71,157,362	5.197	26.318	58,171,288	65,999,112	85,035,632	96,568,897
27.50 - 28.50	2.67	145,207,586	34,966,955	5.197	27.047	28,378,644	32,314,012	41,939,823	47,802,337
28.50 - 29.50	0.00	0	0	0.000	0.000	0	0	0	0
29.50 - 30.50	0.00	0	0	0.000	0.000	0	0	0	0
VLONG(20.5+)	40.91	1,886,323,403	535,866,639	5.239	23.635	450,239,198	503,960,711	632,132,063	708,378,458
Total	100.00	3,534,759,130	1,310,015,566	5.289	17.568	1,167,619,425	1,266,730,400	1,496,176,395	1,628,899,234

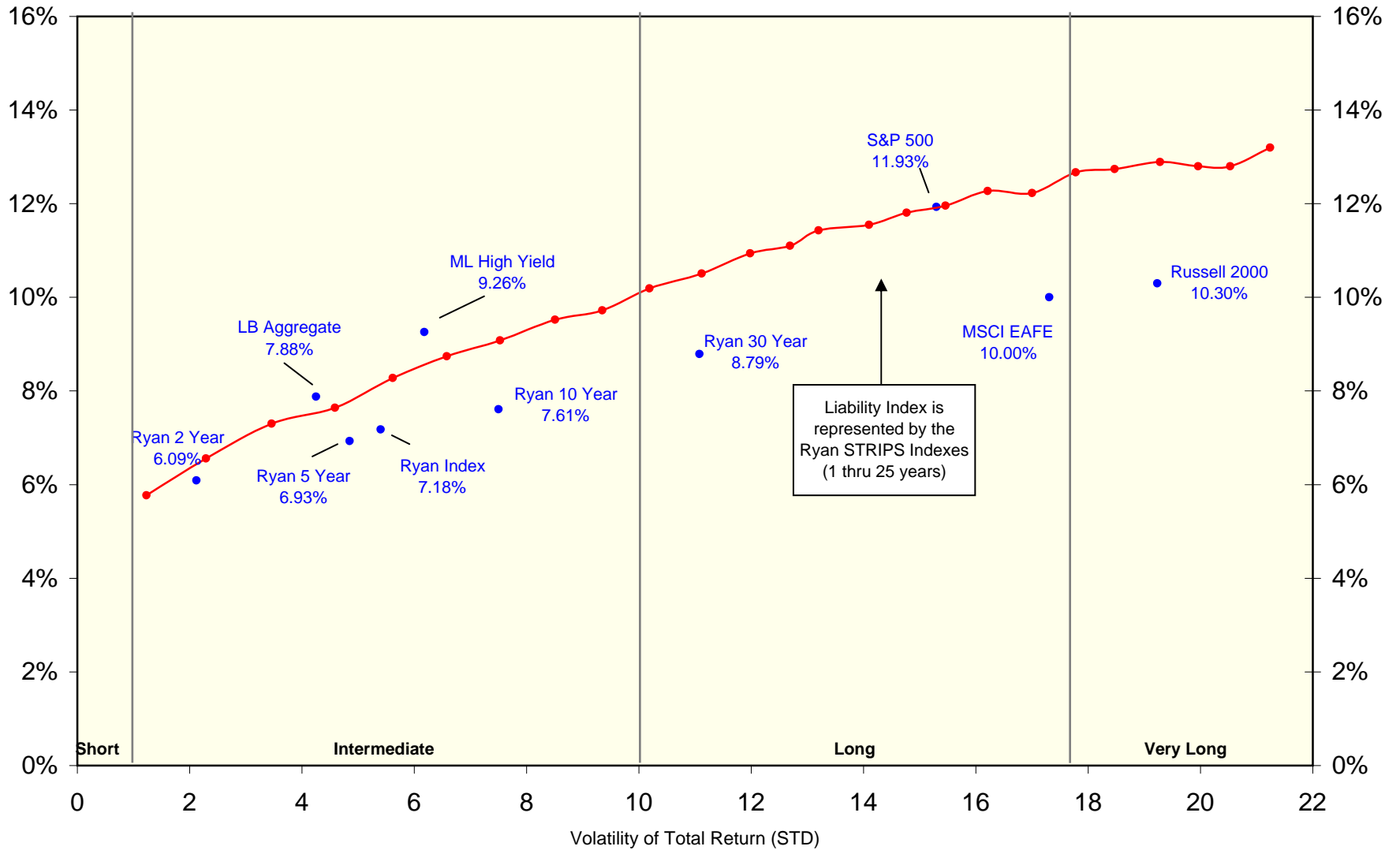
Ryan ALM, Inc.

Assets vs. Liabilities Scoreboard

Twenty Year Returns Ending 12/31/05

Annualized Return

Annualized Return



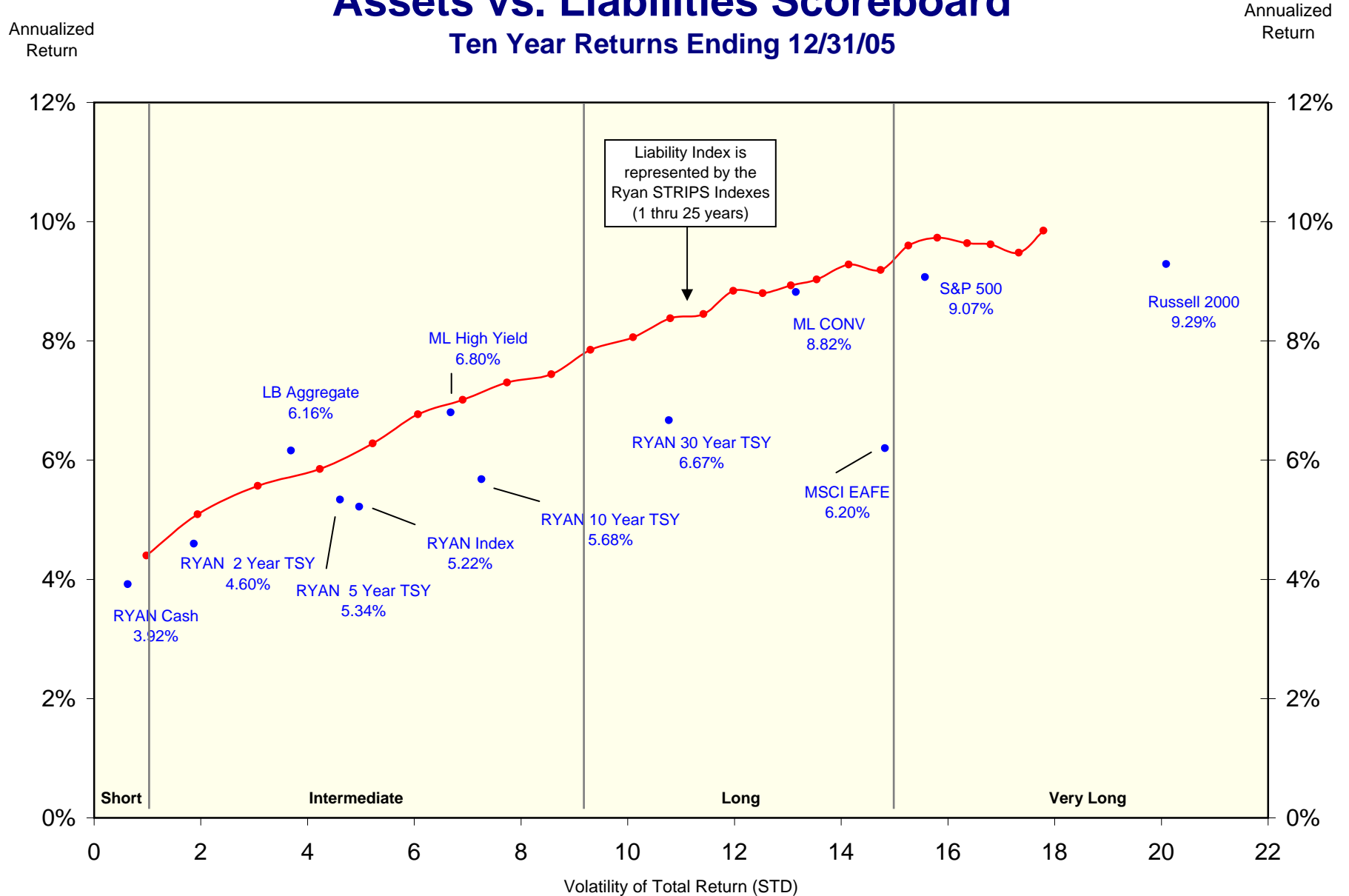
Sources: Ryan ALM, Standard & Poor's, Lehman Brothers, Merrill Lynch, Morgan Stanley, Frank Russell.

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.**

Ryan ALM, Inc.

Assets vs. Liabilities Scoreboard

Ten Year Returns Ending 12/31/05



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

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.**

**Testimony of Ronald J. Ryan, CFA
CEO of Ryan ALM, Inc.
To the Working Group on a Prudent Investment Process of
Labor Advisory Council on Employee Welfare and Pension Benefit Plans**

Thank you for the opportunity to share my thoughts on how to improve the investment process of America's pension plans.

Answers to DB Questions :

1. What is the function of investment policy ?

There are 3 functions of investment policy :

- 1. To make clear the true objective of the plan ... which is to fund the liabilities at the lowest cost to the plan with prudent risks.**
- 2. Investment policy should also place restrictions (i.e., acceptable investments and strategies) that reduce the risks of the objective not being met.**
- 3. Finally, policy should create procedures to police and monitor that the true objective is being met with alarms that go off early if any problems arise.**

2. What time horizon should be used for performance measurement?

Although the true time horizons are the benefit payment dates (maturity ladder) the performance needs to be monitored frequently. Quarterly is a common procedure but more frequent is advisable such that daily reports available upon demand (transparency) is an ultimate goal ... just like mutual funds.

3. Should returns be absolute or relative?

Relative to a CUSTOM LIABILITY INDEX.

4. Should performance be NET of management fees?

YES. but do not include other fees (custodial, consultant, etc.)

5. Are Alternative Investments appropriate?

YES, for Alpha portfolios. NO, for Beta portfolios.