Ronald Ryan, CEO, CFA

Liability Indexes

"Caveat Emptor"

As the former Director of Fixed Income Research for Lehman, I designed many of the popular Lehman bond indexes. In the late 1970's, I visited the key pension consultants and convinced them to use our Lehman indexes as the bogey or benchmark for bonds. I then traveled extensively to visit our clients to help them understand our bond benchmarks and provide strategies on the best way to outperform these indexes. As I listened to our clients, I heard that their true objective was liability driven and not market driven. Certainly that was true for Pensions, Banks, Insurance companies, Lotteries, Nuclear Decommissioning … indeed, most of our clients. It should be obvious that no Lehman bond index or any generic bond index could ever represent the unique cash flow structure of a liability driven objective. In fact, any generic index could bias investments in a direction that would contradict the interest rate sensitivity of a client's liability schedule (wrong duration and cash flow schedule). The pension world has recently awakened to this same conclusion. We now have several liability index versions being marketed. Clients are faced with the decision of what benchmark best represents their true economic liability driven objective. As I have preached and warned for decades … ***given the wrong index, you will get the wrong risk/reward!***

Genesis

In 1991, I designed the 1st Liability Index in America. Ever since, I have been on a mission to help clients understand their liabilities unique risk/reward behavior. For years, I was met with controversy as to why I would question the prevailing accounting rules and actuarial practices. Finally, most of the pension industry has now also realized that given inappropriate accounting rules and actuarial practices, pensions have been misled as to the true economic value of their liabilities. These rules and practices require pensions to price liabilities at a **single discount rate, very infrequently (i.e. annually)** and at a **rate higher** (if not much higher) **than market rates**. Now as these rules are being changed to a more market focus, we have several firms offering Liability Indexes. This report will explore the problems and solutions with any liability index. To illustrate the dramatic differences and problems we created a proxy pension benefit payment schedule (future value) of $1 million per month for 30 years … a $360 million future value cash flow schedule and an average duration of 11.191 years. We then priced this static cash flow using various discount rate methodologies.

Pension Objective

The objective of a pension plan should be **to fund the benefits at the lowest cost to the plan and with minimal volatility in contributions and the funded ratio**. Indeed, many plans have this stated as investment policy and even written into state constitutions. Such an objective would require over time a shift in asset allocation towards a *matching* of assets vs. liabilities to reduce such volatility and costs. To match liabilities on a present value basis should require a liability index or benchmark that accurately and frequently calculates the market value of liabilities such that the economic funded ratio can be monitored. A miscalculation of the true economic value of liabilities would likely misdirect the asset allocation strategy due to a misinterpretation of the true funded ratio. Noteworthy is that total pension operational costs (including actuary, consultant, asset managers and internal staff) are usually less than 50 basis points annually. As a result, an error in calculating the present value of liabilities by 50 basis points should be significant representing a full year of operational costs. To meet the pension objective all cost factors should be managed and monitored.

Annuities

The annuity is a favored way to price pension liabilities. In truth, the annuity is a rate that settles or fully funds the liability and releases the plan sponsor from any liability. However, it is a negotiated rate and seldom, if ever, seen for large plans over $1 billion. This makes it difficult, if not impossible, to use as a discount rate. What is misleading here is that **the annuity rate is really not a discount rate … it is an asset growth rate or rate of return**. Annuities are usually thought of as providing a positive growth rate with little volatility. If the annuity rate went from 5.00% to 6.00% plan sponsors tend to assume that liabilities will now grow at 6.00%. It is usually not presented in a way that would suggest any negative growth. But if a 10-year average duration liability schedule had its discount rate change from a 5.00% rate to a 6.00% over one year, it should show a -5.00% present value change (price return of -10% + income return of 5.00% = -5.00% total return). The other problem is that **the annuity is a single rate and not a yield curve**. This is certainly not indicative of market rates which almost always have a yield curve (slope) which could be radically different from short to long maturities (widest spread from 3-month Bill to 30-year Treasury = 467 bps. in October 1992 and 456 bps in May 2004). To price every liability at the same yield is inconsistent with economic reality and therefore an erroneous or hypothetical calculation. The truth is … **Annuities are best used as an asset strategy and not a liability discount rate!** If negotiated well, they could fund some (i.e. retirees) if not all of the pension liabilities. Annuities are a very good asset strategy to defease (fully fund) liabilities, if you can execute them, but not a good discount rate to value liabilities.

PBGC / Annuity Rates

The PBGC is the classic Annuity example. The PBGC is required by their rules to use a survey of annuity rates as their discount rates. In the exhibits in the Appendix, it shows that for 12/31/06 the PBGC priced their liabilities at 5.80% for the first 20-years of payments and at a 4.75% for the longer than 20-years payments (a rather strange yield curve). Compared to the market (using Treasury STRIPS) there is a 5.22% difference in present value ($9,945,050) and a 5% difference in sensitivity but only a very small duration variance. This present value and sensitivity differential of about 5% represents an error equivalent to about 10 years of operational costs :

PBGC Discount Rates
12/31/06

	Annuity	STRIPS	Difference
Present Value ($)	180,463,400	190,408,450	-9,945,050
Duration (years)	11.252	11.191	0.061
Avg. Discount Rate	5.582 %	4.823 %	0.759 %
Sensitivity + 100 bps	160,294,730	168,562,600	-8,267,870
Sensitivity – 100 bps	199,749,640	209,743,570	-9,993,930

IRS / Treasury Discount Rates (PPA for Private Plans)

The IRS regulations for minimum contribution and funding calculations rely on the Treasury department calculation of discount rates based on the Pension Equity Funding Act and soon the new PPA rules. The new PPA rules require a three tiered corporate bond yield curve (1-5 years, 5-15 years and 15+ years) after 12/31/07 phased in over three years. In essence this will be a yield curve with just three discount rates. As such it would not price or value the term structure of a pension accurately which has monthly benefit payments out 30+ years. Since there are no zero-coupon corporate bonds prevalent in today's bond market, it remains to be seen how the Treasury will create such a hypothetical yield curve. As I have preached ad nausea, if you can't buy the discount rates you should not be allowed to use them since they are not real and the plan could not defease or match liabilities based on these rates. Until 2008 the IRS relies on the previous Pension Equity Funding Act which requires the Treasury to calculate an average discount rate based on a four year weighted average of long investment grade corporate rates from three Wall Street brokerage firms. These weights are skewed to 40% of the last 12 months average index yields, 30% of the last 13 to 24 months, 20% of the last 25 to 36 months and 10% of the last 37 to 48 months. By definition, **a moving average will never represent current market rates**. These long bond indexes all begin with 10.0 year maturities suggesting they start with minimum durations of around 7.50 years. Since these three indexes only use coupon bonds, the longest duration here is about 15 years. This is a very truncated yield curve and **doesn't price or value more than half of a typical pension cash flow schedule**. Once again there is no well defined yield curve with these three indexes. This amalgamation of indexes prices liabilities (present value) about 9.4% lower than market rates (i.e. Treasury STRIPS). Such an error represents about 19 years of operational costs:

IRS Discount Rates for Minimum Contributions / Funding
(4 year Average of Corporate Rates)

	IRS Rates	STRIPS	Difference
Present Value ($)	172,505,620	190,408,450	-17,902,830
Duration (years)	10.612	11.191	-0.579
Avg. Discount Rate	5.780 %	4.823 %	0.957 %
Sensitivity + 100 bps	153,959,540	168,562,600	-14,603,060
Sensitivity – 100 bps	189,488,070	209,743,570	-20,255,500

FASB 87

FAS 87 allows corporations to price their liabilities at high-quality bond rates defined as AA or better. A search began in 1986 for the highest yielding index that was AA or better with a long duration. The best candidate at the time was the Moody's long AA corporate bond index. This index was invented over 50 years ago and belongs in a financial museum not on your balance sheet. This index is loaded with strange methodologies for composition (10 Industrials, 6 Utility issues, no Finance issues), weights (equal weighting of the Industrials and Utilities sectors but market weighting of each issue in sector), issue selection (no Finance issues), yield calculation (average yield for month not a month end yield), summary data (uses maturity dates even if callable) and is not transparent (does not publish portfolio). As of 12/31/06 the Moody's long AA corporate bond index priced liabilities about 8.5% different than the market representing an error equivalent to about 17 years of operational costs :

FASB Financial Statement Rates (Moody's AA Long Corporate)

	Moody's AA	STRIPS	Difference
Present Value ($)	173,609,600	190,408,450	-16,798,850
Duration (years)	10.653	11.191	-0.538
Avg. Discount Rate	5.720 %	4.823 %	0.897 %
Sensitivity + 100 bps	154,865,720	168,562,600	-13,696,880
Sensitivity – 100 bps	190,747,820	209,743,570	-18,995,750

FAS 158

FAS 87 says that the assumed discount rates shall reflect the rates at which the pension benefits could be effectively settled. FAS 106 paragraph 186 and FAS 158 paragraph 44a are identical, they say: " The objective of selecting assumed discount rates using that method is to measure the single amount that, if invested at the measurement date in a portfolio of high-quality debt instruments, would provide the necessary future cash flows to pay the pension benefits when due. Notionally, that single amount, the projected benefit obligation, would equal the current **market value of a portfolio of high-quality zero coupons whose maturity dates and amounts would be the same as the timing and amounts of expected future benefit payments**". FAS 158 could correct the current valuation distortion since it requires a **yield curve pricing methodology based on zero-coupon bonds … Amen!** Hopefully, corporations will use the Treasury STRIPS yield curve and not a hypothetical corporate yield curve or interest rate swaps. What FASB and all rules should require is proof that you can buy the discount rate being used. FASB 87, 106 and 158 all say that it should be a **settlement rate**. By definition, that is a rate(s) that can **defease** the liabilities. The rules should enforce … **that if you can't buy the discount rate(s) then you can not use it!** Hypothetical zero coupon bonds should not be allowed. Attached in the Appendix is a hypothetical yield curve priced at STRIPS + 50 basis points. It shows a 5.4% difference in present value equal to about 11 years of operational costs:

	STRIPS + 50 bps	STRIPS	Difference
Present Value ($)	180,202,780	190,408,450	- 10,205,670
Duration (years)	10.845	11.191	- 0.346
Avg. Discount Rate	5.320 %	4.823 %	0.497
Sensitivity + 100 bps	160,242,750	168,562,600	- 8,319,850
Sensitivity – 100 bps	198,093,950	209,743,570	- 11,649,620

Interest Rate Swaps

Interest rate swaps have been recommended as an answer to FAS 158. But such financial instruments are contracts and not assets. As a result, **you can not defease or settle liabilities with interest rate swaps!** If the assets are invested in asset classes that usually have a low correlation to liabilities (i.e. equities) then you can not match or defease liabilities. Interest rate swaps in 2000 thru 2002 would not have hedged or matched liabilities if the assets were invested in equities and other non-liability matching assets although they would have improved the situation. The volatility of these assets (i.e. equity) remains uncorrelated to liabilities so the funding ratio is affected accordingly. In the end, interest rate swaps are an asset tool but not a discount rate.

ASOP 27 and GASB (Public Plans)

By far the greatest disparity in present value calculation is in the Public Plan arena. Both ASOP 27 and GASB allow Public pension plans to discount liabilities at the Return on Asset (ROA) assumption. According to the most recent NASRA study, this averages to 8.00% among the major state pension plans. Such a discount rate tends to be rather static over time. Moreover, it is a single discount rate and not a yield curve. Even more curious is that most plan sponsors don't see this valuation until six months or more after the end of their fiscal year. The difference versus market rates (i.e. STRIPS) is staggering. In our example below with an 11.191 year average duration for STRIPS (market value) the present value difference is **27.28%**. This pricing error is the equivalent of about 55 years of total pension operational costs (@ 50 basis points per year). More importantly, it **erroneously raises the Funding Ratio by 37.51%** (100 / 72.72 = 137.51). This false and enhanced Funding Ratio methodology has led many public plans to increase Benefits and/or decrease Contributions at a time they could ill afford to do so. It is hard to believe that a pension plan could function effectively with such erroneous and infrequent information. Hopefully, GASB will adopt the FAS 158 guidelines and create a more universal liability pricing methodology that has been accepted in Europe (FRS 17, IASB 19) for years.

	ASOP 27	STRIPS	Difference
Present Value ($)	138,459,270	190,408,450	-51,949,180
Duration (years)	9.226	11.191	-1.965
Avg. Discount Rate	8.000 %	4.823 %	3.177 %
Sensitivity + 100 bps	125,714,240	168,562,600	-42,848,360
Sensitivity – 100 bps	150,709,830	209,743,570	-59,033,740

UBS / iBoxx Liability Indexes

On October 18, 2006 UBS announced that it had partnered with International Index Company (IIC) to launch a suite of iBoxx US Pension Liability Indices. Namely, a three-index set of benchmarks that seek to mimic pension liability performance:

1. **Aggregate** Index - Designed to mimic the overall performance of model defined benefit plan in the US.
2. **Active** Index – Designed to mimic the overall performance of an active (non-retired) member liability profile.
3. **Retired** Index – Designed to mimic the overall performance of a retired member liability profile for a model US defined benefit plan.

The UBS Media Release says, "**When developing a pension fund's investment policy, defined benefit plan sponsors are increasingly concerned with managing the volatility of their plan's funding ratio**. To manage the ratio more effectively, they must develop solid investment strategies that consider plan's liabilities in addition to many other factors. We believe that these indices will provide investable and appropriate benchmarks for such strategies".

It is good that UBS acknowledges that a pension has a retired life and an active life component that behave differently. It is good that UBS acknowledges and uses the words performance of liability to suggest a volatile growth or total return behavior such that the total returns of assets should be compared to the total return of liabilities. It is great that UBS also acknowledges that a **pension fund investment policy and strategy should be to manage the volatility of their funding ratio** … right on! What is wrong here is the use of generic indices to

capture the liability growth behavior of each and every pension situation. Similar to Cinderella's slippers, no generic index could possibly price or value every, or even several, pension fund benefit payment schedules. **The truth is that each pension fund is unique given a different labor force … different mortality … different salary structure … and certainly different plan amendments**. The differences can be enormous resulting in wide duration, term structure profiles and interest rate sensitivity. The error here in calculating liability performance (growth rate) and present values can be quite significant resulting in funding ratio errors which would lead to investment strategy (asset allocation) errors.

Longevity Indexes

In early 2006 Credit Suisse introduced their Longevity Index as a standardized measure of the Expected Average Lifetime for a general population. Their 2006 U.S. Composite Index Value was 80.6 years. **There are no securities in this index**. Once again a generic index could never fit the unique and varied term structures of a pension cash flow schedule. There have been very few longevity bonds ever issued. The Swiss Re Mortality bond was issued December 2003 with a maturity of January 2007 for $400 million. The other bond of note was a BNP Paribas Longevity bond which was announced November 2004 with a 25 year maturity but withdrawn due to lack of interest. Credit Suisse believes their new index this will promote the use of longevity swaps and longevity structured notes. Longevity indexes might be an interesting study but certainly are not a proper benchmark for liabilities for all the reasons repeated throughout this paper: the index doesn't match or defease liabilities, is not a yield curve, can't buy it, and certainly not customized to each client's unique cash flow schedule.

Lehman Liability Indexes

Lehman has recently introduced their Zero Coupon Nominal Swaps and Zero Coupon Inflation Swaps indices. Their research report as of December 2006 made it clear that the popular **Lehman Aggregate, Long Government/Credit indices are not a good fit as benchmarks for pensions and any LDI objective … Alleluia!** They also question or caution on the use of these new indexes as liability benchmarks. Lehman says, **"These techniques, which provide the advantage of simplicity, nevertheless present a number of limitations. While the duration of the benchmark may closely resemble that of the liability stream, the term structure differential between the benchmark and liabilities could be significant, leaving exposure to changes in the shape of the curve. For liability streams that are frozen, an added challenge is presented by the index turnover each month that will hold the duration somewhat constant, while the liabilities will decrease in duration over time, causing an undesired duration drift between the two".** Well said by Lehman … congratulations to their integrity and foresight here. No generic index could ever match or represent the unique cash flow of a pension benefit payment schedule. Only a Custom liability Index is the approximate liability benchmark for assets to manage against as well as the most accurate way to price liabilities (i.e. discount rates).

Immunization

Matching the average duration of liabilities (i.e. Immunization methodology) does not mean you have an index or portfolio that matches the interest rate risk of liabilities. As we learned from immunization, **you must match each and every liability payment (term structure) to hedge liabilities accurately**. You certainly could not defease or immunize interest rate sensitivity for a pension fund with an average 12-year duration by buying 100% 12-year duration zero-coupon bonds. We ran our Ryan 1-23 year STRIPS indexes versus the Ryan 12-year STRIPS index for the last 10 years (12/31/96 to 12/31/06) and got a monthly Tracking Deviation of 35 basis points and a cumulative return difference of 10.16%. Over an 18 year period (12/31/88 to 12/31/06) the Tracking deviation was 33 basis points with a **cumulative growth differential of 47.98%! You must match or hedge each monthly benefit payment**. If you don't then whenever the yield curve changes shape (takes about a day) you are no longer matched. This is why no generic index could ever be a good benchmark for liability growth behavior. Only a Custom Liability Index could value and measure the volatility of the present value of each monthly benefit payment. **Only a Custom Liability Index could be a proper liability index benchmark !**

SoA Research

In October 2004, the SoA (Society of Actuaries) released a white paper titled "Principles Underlying Asset Liability Management". In it they state succinctly the need to value liabilities at the market (i.e. economic books) … "A consistent ALM structure can only be achieved for economic objectives. Accounting measures can sometimes distort economic reality and produce results inconsistent with economic value. Because ALM is concerned with the future asset and liability cash flows, the natural focus of ALM is economic value. Entities that focus on economic

value tend to achieve their financial objectives more consistently in the long term." Translation is … pension plans need to create a set of economic books so Asset Liability Management (ALM) can function effectively.

Ryan Custom Liability Indexes

In 1985 when STRIPS were born, my index team and I designed the **1st Treasury STRIPS Index** series at my initial firm (RFSG). In 1991, we used these indexes weighted to any client's unique liability cash flow schedule to create the **1st Liability Index**. We created a generic version with static equal weights for educational purposes and a weighted version that best represents each client's actuarially defined cash flow schedule as the proper liability benchmark (i.e. Custom Liability Index). Since 1991, my team and I have created numerous Custom Liability Indexes for every type of liability driven client (i.e. Pensions, Lotteries, NDT, Healthcare, Insurance).

We strongly believe that a **Custom Liability Index composed of Treasury STRIPS best fits the true client objective and best complies with the SoA research, FAS 87, FAS 106 and now FAS 158**. However, we will price liabilities at any discount rate the client deems is in their best interests. The SoA states that until a set of ***economic books*** are created that monitor the market value of liabilities, assets can not be managed effectively versus a liability driven objective. FASB repeats and stresses that the **discount rates to be used should be a *zero-coupon portfolio* as the *settlement rate(s)*** since only a zero-coupon bond has a certain future value. **This means a rate that can settle or defease the liability. It must be a rate you can purchase not a hypothetical rate. There must be a rate for each monthly benefit payment**. Any index or discount rate methodology that can not settle liabilities and can not be customized to the unique cash flow term structure of every client should not be used as a benchmark for asset management purposes versus a liability driven objective (ALM).

Conclusion

As the following reports demonstrate, there is a significant difference in liability valuation among the various discount rate methodologies currently in vogue and marketed. This results in **erroneous funding ratios which usually lead to inappropriate benefit decisions, inappropriate contribution decisions and inappropriate asset allocation decisions**. Pension consultants and plan sponsors are very conscious of tracking error on assets versus market indexes. They should apply the same focus on the liability side. Until you calculate an accurate economic or market valuation of liabilities (for each monthly payment), the pension plan is in great jeopardy of reacting to misleading information that puts the plan at great risk and cost. This has been witnessed too vividly in the last few years with many pension plans terminated, frozen or hit with unexpected and unbudgeted pension contribution spikes extending into the projected future. **Only a Custom Liability Index that prices each monthly benefit payment as a weighted yield curve index could ever calculate the true economic value of liabilities**. Given the wrong liability valuation calculation or methodology would lead to an erroneous Funding Ratio which would mislead and influence the asset allocation decision, the contribution decision and the benefit decision.

Given The Wrong Index … You Will Get The Wrong Risk / Reward
Ron Ryan, CEO

Ryan ALM, Inc
Benefit Payments(STRIPS) - Structure
12/31/2006

Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	6.15	12	12,000,000	11,712,590	0.00	97.624	4.862	0.483
01.01 - 02.50	8.70	18	18,000,000	16,565,070	0.00	92.063	4.841	1.699
02.50 - 03.50	5.48	12	12,000,000	10,439,770	0.00	87.013	4.704	2.925
03.50 - 04.50	5.25	12	12,000,000	10,005,690	0.00	83.391	4.605	3.905
04.50 - 05.50	5.04	12	12,000,000	9,605,020	0.00	80.065	4.503	4.884
05.50 - 06.50	4.78	12	12,000,000	9,099,370	0.00	75.843	4.668	5.857
06.50 - 07.50	4.55	12	12,000,000	8,672,730	0.00	72.288	4.695	6.833
07.50 - 08.50	4.34	12	12,000,000	8,256,200	0.00	68.815	4.731	7.809
08.50 - 09.50	4.13	12	12,000,000	7,854,430	0.00	65.468	4.767	8.784
09.50 - 10.50	3.92	12	12,000,000	7,465,430	0.00	62.226	4.805	9.759
INTER(1- 10.50)	**46.20**	**114**	**114,000,000**	**87,963,710**	**0.00**	**78.450**	**4.709**	**5.270**
10.50 - 11.50	3.72	12	12,000,000	7,079,000	0.00	59.004	4.858	10.733
11.50 - 12.50	3.53	12	12,000,000	6,712,780	0.00	55.956	4.901	11.706
12.50 - 13.50	3.34	12	12,000,000	6,353,150	0.00	52.957	4.953	12.679
13.50 - 14.50	3.16	12	12,000,000	6,019,320	0.00	50.173	4.991	13.653
14.50 - 15.50	3.00	12	12,000,000	5,718,170	0.00	47.661	5.005	14.628
15.50 - 16.50	2.86	12	12,000,000	5,446,670	0.00	45.397	5.000	15.604
16.50 - 17.50	2.72	12	12,000,000	5,184,340	0.00	43.212	4.999	16.579
17.50 - 18.50	2.59	12	12,000,000	4,937,380	0.00	41.153	4.996	17.555
18.50 - 19.50	2.47	12	12,000,000	4,709,010	0.00	39.249	4.986	18.532
19.50 - 20.50	2.37	12	12,000,000	4,505,500	0.00	37.551	4.960	19.511
LONG(10.5 - 20.5)	**29.76**	**120**	**120,000,000**	**56,665,320**	**0.00**	**48.226**	**4.960**	**14.713**
20.50 - 21.51	2.27	12	12,000,000	4,319,320	0.00	36.000	4.927	20.490
21.50 - 22.50	2.17	12	12,000,000	4,128,670	0.00	34.411	4.910	21.467
22.50 - 23.50	2.09	12	12,000,000	3,973,930	0.00	33.119	4.864	22.450
23.50 - 24.50	1.99	12	12,000,000	3,794,560	0.00	31.632	4.856	23.424
24.50 - 25.50	1.89	12	12,000,000	3,606,280	0.00	30.058	4.868	24.400
25.50 - 26.50	1.81	12	12,000,000	3,436,920	0.00	28.646	4.868	25.376
26.50 - 27.50	1.72	12	12,000,000	3,275,550	0.00	27.301	4.868	26.353
27.50 - 28.50	1.64	12	12,000,000	3,121,720	0.00	26.019	4.868	27.329
28.50 - 29.50	1.56	12	12,000,000	2,975,110	0.00	24.797	4.868	28.305
29.50 - 30.00	0.75	6	6,000,000	1,434,770	0.00	23.914	4.868	29.040
VLONG(20.5 - 30.00)	**17.89**	**114**	**114,000,000**	**34,066,830**	**0.00**	**30.376**	**4.879**	**24.304**
Total (0.00 - 30.00)	**100.00**	**360**	**360,000,000**	**190,408,450**	**0.00**	**62.034**	**4.823**	**11.191**

Ryan ALM, Inc
Benefit Payments(PBGC) - Structure
12/31/2006

Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	6.46	12	12,000,000	11,664,360	0.00	97.229	5.800	0.481
01.01 - 02.50	9.03	18	18,000,000	16,293,050	0.00	90.572	5.800	1.688
02.50 - 03.50	5.60	12	12,000,000	10,111,120	0.00	84.282	5.800	2.909
03.50 - 04.50	5.29	12	12,000,000	9,549,220	0.00	79.598	5.800	3.881
04.50 - 05.50	5.00	12	12,000,000	9,018,590	0.00	75.175	5.800	4.853
05.50 - 06.50	4.72	12	12,000,000	8,517,400	0.00	70.997	5.800	5.824
06.50 - 07.50	4.46	12	12,000,000	8,044,070	0.00	67.052	5.800	6.796
07.50 - 08.50	4.21	12	12,000,000	7,597,040	0.00	63.326	5.800	7.768
08.50 - 09.50	3.98	12	12,000,000	7,174,870	0.00	59.807	5.800	8.740
09.50 - 10.50	3.75	12	12,000,000	6,776,170	0.00	56.483	5.800	9.712
INTER(1- 10.50)	**46.04**	**114**	**114,000,000**	**83,081,530**	**0.00**	**74.661**	**5.800**	**5.170**
10.50 - 11.50	3.55	12	12,000,000	6,399,590	0.00	53.344	5.800	10.683
11.50 - 12.50	3.35	12	12,000,000	6,043,960	0.00	50.380	5.800	11.655
12.50 - 13.50	3.16	12	12,000,000	5,708,100	0.00	47.580	5.800	12.627
13.50 - 14.50	2.99	12	12,000,000	5,390,890	0.00	44.936	5.800	13.599
14.50 - 15.50	2.82	12	12,000,000	5,091,310	0.00	42.439	5.800	14.571
15.50 - 16.50	2.66	12	12,000,000	4,808,380	0.00	40.081	5.800	15.543
16.50 - 17.50	2.52	12	12,000,000	4,541,160	0.00	37.853	5.800	16.514
17.50 - 18.50	2.38	12	12,000,000	4,288,820	0.00	35.750	5.800	17.486
18.50 - 19.50	2.24	12	12,000,000	4,050,480	0.00	33.763	5.800	18.458
19.50 - 20.50	2.36	12	12,000,000	4,259,290	0.00	35.777	5.228	19.510
LONG(10.5 - 20.5)	**28.03**	**120**	**120,000,000**	**50,581,980**	**0.00**	**43.155**	**5.752**	**14.649**
20.50 - 21.51	2.48	12	12,000,000	4,478,350	0.00	37.326	4.750	20.507
21.50 - 22.50	2.37	12	12,000,000	4,272,970	0.00	35.615	4.750	21.484
22.50 - 23.50	2.26	12	12,000,000	4,077,010	0.00	33.981	4.750	22.461
23.50 - 24.50	2.16	12	12,000,000	3,890,030	0.00	32.423	4.750	23.438
24.50 - 25.50	2.06	12	12,000,000	3,711,660	0.00	30.936	4.750	24.414
25.50 - 26.50	1.96	12	12,000,000	3,541,430	0.00	29.517	4.750	25.391
26.50 - 27.50	1.87	12	12,000,000	3,379,030	0.00	28.164	4.750	26.368
27.50 - 28.50	1.79	12	12,000,000	3,224,070	0.00	26.872	4.750	27.345
28.50 - 29.50	1.70	12	12,000,000	3,076,190	0.00	25.640	4.750	28.322
29.50 - 30.00	0.82	6	6,000,000	1,484,790	0.00	24.748	4.750	29.057
VLONG(20.5 - 30.00)	**19.47**	**114**	**114,000,000**	**35,135,530**	**0.00**	**31.330**	**4.750**	**24.319**
Total (0.00 - 30.00)	**100.00**	**360**	**360,000,000**	**180,463,400**	**0.00**	**58.853**	**5.582**	**11.252**

Ryan ALM, Inc
Benefit Payments(IRS Corporate) - Structure
12/31/2006

Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	6.76	12	12,000,000	11,665,480	0.00	97.238	5.780	0.481
01.01 - 02.50	9.45	18	18,000,000	16,298,540	0.00	90.602	5.780	1.688
02.50 - 03.50	5.86	12	12,000,000	10,117,000	0.00	84.331	5.780	2.909
03.50 - 04.50	5.54	12	12,000,000	9,556,650	0.00	79.660	5.780	3.881
04.50 - 05.50	5.23	12	12,000,000	9,027,320	0.00	75.248	5.780	4.853
05.50 - 06.50	4.94	12	12,000,000	8,527,310	0.00	71.080	5.780	5.825
06.50 - 07.50	4.67	12	12,000,000	8,055,020	0.00	67.143	5.780	6.797
07.50 - 08.50	4.41	12	12,000,000	7,608,850	0.00	63.424	5.780	7.769
08.50 - 09.50	4.17	12	12,000,000	7,187,410	0.00	59.911	5.780	8.741
09.50 - 10.50	3.94	12	12,000,000	6,789,320	0.00	56.593	5.780	9.713
INTER(1- 10.50)	**48.21**	**114**	**114,000,000**	**83,167,420**	**0.00**	**74.726**	**5.780**	**5.172**
10.50 - 11.50	3.72	12	12,000,000	6,413,300	0.00	53.458	5.780	10.685
11.50 - 12.50	3.51	12	12,000,000	6,058,060	0.00	50.497	5.780	11.656
12.50 - 13.50	3.32	12	12,000,000	5,722,530	0.00	47.701	5.780	12.628
13.50 - 14.50	3.13	12	12,000,000	5,405,570	0.00	45.058	5.780	13.600
14.50 - 15.50	2.96	12	12,000,000	5,106,180	0.00	42.563	5.780	14.572
15.50 - 16.50	2.80	12	12,000,000	4,823,350	0.00	40.205	5.780	15.544
16.50 - 17.50	2.64	12	12,000,000	4,556,210	0.00	37.979	5.780	16.516
17.50 - 18.50	2.49	12	12,000,000	4,303,840	0.00	35.875	5.780	17.488
18.50 - 19.50	2.36	12	12,000,000	4,065,460	0.00	33.888	5.780	18.460
19.50 - 20.50	2.23	12	12,000,000	3,840,300	0.00	32.011	5.780	19.432
LONG(10.5 - 20.5)	**29.16**	**120**	**120,000,000**	**50,294,800**	**0.00**	**43.040**	**5.780**	**14.604**
20.50 - 21.51	2.10	12	12,000,000	3,627,600	0.00	30.238	5.780	20.404
21.50 - 22.50	1.99	12	12,000,000	3,426,670	0.00	28.563	5.780	21.376
22.50 - 23.50	1.88	12	12,000,000	3,236,870	0.00	26.981	5.780	22.347
23.50 - 24.50	1.77	12	12,000,000	3,057,580	0.00	25.487	5.780	23.319
24.50 - 25.50	1.67	12	12,000,000	2,888,230	0.00	24.075	5.780	24.291
25.50 - 26.50	1.58	12	12,000,000	2,728,260	0.00	22.742	5.780	25.263
26.50 - 27.50	1.49	12	12,000,000	2,577,150	0.00	21.482	5.780	26.235
27.50 - 28.50	1.41	12	12,000,000	2,434,410	0.00	20.292	5.780	27.207
28.50 - 29.50	1.33	12	12,000,000	2,299,560	0.00	19.168	5.780	28.179
29.50 - 30.00	0.64	6	6,000,000	1,101,590	0.00	18.361	5.780	28.911
VLONG(20.5 - 30.00)	**15.87**	**114**	**114,000,000**	**27,377,920**	**0.00**	**24.599**	**5.780**	**24.124**
Total (0.00 - 30.00)	**100.00**	**360**	**360,000,000**	**172,505,620**	**0.00**	**59.055**	**5.780**	**10.612**

Ryan ALM, Inc
Benefit Payments(Moodys AA) - Structure
12/31/2006

Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	6.72	12	12,000,000	11,668,830	0.00	97.266	5.720	0.481
01.01 - 02.50	9.40	18	18,000,000	16,315,060	0.00	90.693	5.720	1.689
02.50 - 03.50	5.84	12	12,000,000	10,134,670	0.00	84.478	5.720	2.910
03.50 - 04.50	5.52	12	12,000,000	9,578,930	0.00	79.845	5.720	3.882
04.50 - 05.50	5.21	12	12,000,000	9,053,660	0.00	75.467	5.720	4.854
05.50 - 06.50	4.93	12	12,000,000	8,557,180	0.00	71.329	5.720	5.827
06.50 - 07.50	4.66	12	12,000,000	8,087,910	0.00	67.417	5.720	6.799
07.50 - 08.50	4.40	12	12,000,000	7,644,420	0.00	63.720	5.720	7.771
08.50 - 09.50	4.16	12	12,000,000	7,225,220	0.00	60.226	5.720	8.743
09.50 - 10.50	3.93	12	12,000,000	6,829,020	0.00	56.923	5.720	9.715
INTER(1- 10.50)	**48.05**	**114**	**114,000,000**	**83,426,070**	**0.00**	**74.923**	**5.720**	**5.178**
10.50 - 11.50	3.72	12	12,000,000	6,454,530	0.00	53.802	5.720	10.688
11.50 - 12.50	3.51	12	12,000,000	6,100,600	0.00	50.852	5.720	11.660
12.50 - 13.50	3.32	12	12,000,000	5,766,050	0.00	48.063	5.720	12.632
13.50 - 14.50	3.14	12	12,000,000	5,449,870	0.00	45.428	5.720	13.604
14.50 - 15.50	2.97	12	12,000,000	5,151,030	0.00	42.937	5.720	14.576
15.50 - 16.50	2.80	12	12,000,000	4,868,550	0.00	40.582	5.720	15.549
16.50 - 17.50	2.65	12	12,000,000	4,601,580	0.00	38.357	5.720	16.521
17.50 - 18.50	2.51	12	12,000,000	4,349,250	0.00	36.253	5.720	17.493
18.50 - 19.50	2.37	12	12,000,000	4,110,740	0.00	34.265	5.720	18.465
19.50 - 20.50	2.24	12	12,000,000	3,885,330	0.00	32.386	5.720	19.437
LONG(10.5 - 20.5)	**29.23**	**120**	**120,000,000**	**50,737,530**	**0.00**	**43.396**	**5.720**	**14.613**
20.50 - 21.51	2.12	12	12,000,000	3,672,280	0.00	30.610	5.720	20.410
21.50 - 22.50	2.00	12	12,000,000	3,470,910	0.00	28.932	5.720	21.382
22.50 - 23.50	1.89	12	12,000,000	3,280,550	0.00	27.345	5.720	22.354
23.50 - 24.50	1.79	12	12,000,000	3,100,680	0.00	25.846	5.720	23.326
24.50 - 25.50	1.69	12	12,000,000	2,930,650	0.00	24.428	5.720	24.298
25.50 - 26.50	1.60	12	12,000,000	2,769,940	0.00	23.089	5.720	25.271
26.50 - 27.50	1.51	12	12,000,000	2,618,050	0.00	21.823	5.720	26.243
27.50 - 28.50	1.43	12	12,000,000	2,474,470	0.00	20.626	5.720	27.215
28.50 - 29.50	1.35	12	12,000,000	2,338,790	0.00	19.495	5.720	28.187
29.50 - 30.00	0.65	6	6,000,000	1,120,850	0.00	18.682	5.720	28.920
VLONG(20.5 - 30.00)	**16.00**	**114**	**114,000,000**	**27,777,170**	**0.00**	**24.946**	**5.720**	**24.136**
Total (0.00 - 30.00)	**100.00**	**360**	**360,000,000**	**173,609,600**	**0.00**	**59.215**	**5.720**	**10.653**

Ryan ALM, Inc
Benefit Payments(STRIPS + 50 bps) - Structure
12/31/2006

Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	6.48	12	12,000,000	11,684,370	0.00	97.393	5.362	0.481
01.01 - 02.50	9.11	18	18,000,000	16,425,180	0.00	91.293	5.341	1.693
02.50 - 03.50	5.71	12	12,000,000	10,288,370	0.00	85.755	5.204	2.918
03.50 - 04.50	5.45	12	12,000,000	9,812,450	0.00	81.783	5.105	3.895
04.50 - 05.50	5.20	12	12,000,000	9,373,610	0.00	78.139	5.003	4.871
05.50 - 06.50	4.90	12	12,000,000	8,837,050	0.00	73.659	5.168	5.843
06.50 - 07.50	4.65	12	12,000,000	8,381,780	0.00	69.866	5.195	6.816
07.50 - 08.50	4.41	12	12,000,000	7,940,400	0.00	66.186	5.231	7.790
08.50 - 09.50	4.17	12	12,000,000	7,517,320	0.00	62.661	5.267	8.763
09.50 - 10.50	3.95	12	12,000,000	7,110,330	0.00	59.269	5.305	9.735
INTER(1- 10.50)	**47.55**	**114**	**114,000,000**	**85,686,490**	**0.00**	**76.689**	**5.209**	**5.222**
10.50 - 11.50	3.72	12	12,000,000	6,709,570	0.00	55.928	5.358	10.707
11.50 - 12.50	3.51	12	12,000,000	6,331,610	0.00	52.781	5.401	11.677
12.50 - 13.50	3.31	12	12,000,000	5,963,340	0.00	49.710	5.453	12.648
13.50 - 14.50	3.12	12	12,000,000	5,622,580	0.00	46.868	5.491	13.619
14.50 - 15.50	2.95	12	12,000,000	5,315,360	0.00	44.305	5.505	14.592
15.50 - 16.50	2.80	12	12,000,000	5,038,330	0.00	41.995	5.500	15.566
16.50 - 17.50	2.65	12	12,000,000	4,772,400	0.00	39.780	5.499	16.539
17.50 - 18.50	2.51	12	12,000,000	4,522,970	0.00	37.700	5.496	17.512
18.50 - 19.50	2.38	12	12,000,000	4,292,760	0.00	35.781	5.486	18.487
19.50 - 20.50	2.27	12	12,000,000	4,087,190	0.00	34.065	5.460	19.463
LONG(10.5 - 20.5)	**29.22**	**120**	**120,000,000**	**52,656,110**	**0.00**	**45.003**	**5.459**	**14.638**
20.50 - 21.51	2.16	12	12,000,000	3,899,190	0.00	32.499	5.427	20.439
21.50 - 22.50	2.06	12	12,000,000	3,708,950	0.00	30.914	5.410	21.415
22.50 - 23.50	1.97	12	12,000,000	3,552,470	0.00	29.607	5.364	22.395
23.50 - 24.50	1.87	12	12,000,000	3,375,670	0.00	28.142	5.356	23.367
24.50 - 25.50	1.77	12	12,000,000	3,192,540	0.00	26.611	5.368	24.340
25.50 - 26.50	1.68	12	12,000,000	3,027,870	0.00	25.238	5.368	25.314
26.50 - 27.50	1.59	12	12,000,000	2,871,620	0.00	23.936	5.368	26.288
27.50 - 28.50	1.51	12	12,000,000	2,723,480	0.00	22.701	5.368	27.262
28.50 - 29.50	1.43	12	12,000,000	2,582,950	0.00	21.530	5.368	28.236
29.50 - 30.00	0.69	6	6,000,000	1,241,070	0.00	20.686	5.368	28.969
VLONG(20.5 - 30.00)	**16.75**	**114**	**114,000,000**	**30,175,810**	**0.00**	**27.001**	**5.379**	**24.209**
Total (0.00 - 30.00)	**100.00**	**360**	**360,000,000**	**180,202,780**	**0.00**	**60.452**	**5.320**	**10.845**

Ryan ALM, Inc
Benefit Payments(8%) - Structure
12/31/2006

Duration	% Portfolio	# Issues	Par Value	Market Value	Coupon	Price	YTW	MDur
SHORT(0-1)	8.34	12	12,000,000	11,542,500	0.00	96.236	8.000	0.474
01.01 - 02.50	11.34	18	18,000,000	15,702,760	0.00	87.338	8.000	1.667
02.50 - 03.50	6.85	12	12,000,000	9,487,700	0.00	79.104	8.000	2.876
03.50 - 04.50	6.34	12	12,000,000	8,771,920	0.00	73.136	8.000	3.838
04.50 - 05.50	5.86	12	12,000,000	8,110,140	0.00	67.619	8.000	4.799
05.50 - 06.50	5.42	12	12,000,000	7,498,270	0.00	62.517	8.000	5.761
06.50 - 07.50	5.01	12	12,000,000	6,932,590	0.00	57.801	8.000	6.723
07.50 - 08.50	4.63	12	12,000,000	6,409,570	0.00	53.440	8.000	7.684
08.50 - 09.50	4.28	12	12,000,000	5,925,990	0.00	49.408	8.000	8.646
09.50 - 10.50	3.96	12	12,000,000	5,478,920	0.00	45.681	8.000	9.607
INTER(1- 10.50)	**53.67**	**114**	**114,000,000**	**74,317,860**	**0.00**	**68.180**	**8.000**	**4.965**
10.50 - 11.50	3.66	12	12,000,000	5,065,560	0.00	42.234	8.000	10.569
11.50 - 12.50	3.38	12	12,000,000	4,683,400	0.00	39.048	8.000	11.530
12.50 - 13.50	3.13	12	12,000,000	4,330,070	0.00	36.102	8.000	12.492
13.50 - 14.50	2.89	12	12,000,000	4,003,390	0.00	33.379	8.000	13.453
14.50 - 15.50	2.67	12	12,000,000	3,701,350	0.00	30.860	8.000	14.415
15.50 - 16.50	2.47	12	12,000,000	3,422,110	0.00	28.532	8.000	15.376
16.50 - 17.50	2.29	12	12,000,000	3,163,930	0.00	26.379	8.000	16.338
17.50 - 18.50	2.11	12	12,000,000	2,925,240	0.00	24.389	8.000	17.299
18.50 - 19.50	1.95	12	12,000,000	2,704,550	0.00	22.549	8.000	18.261
19.50 - 20.50	1.81	12	12,000,000	2,500,510	0.00	20.848	8.000	19.223
LONG(10.5 - 20.5)	**26.36**	**120**	**120,000,000**	**36,500,110**	**0.00**	**31.960**	**8.000**	**14.280**
20.50 - 21.51	1.67	12	12,000,000	2,311,860	0.00	19.275	8.000	20.184
21.50 - 22.50	1.54	12	12,000,000	2,137,440	0.00	17.821	8.000	21.146
22.50 - 23.50	1.43	12	12,000,000	1,976,200	0.00	16.477	8.000	22.107
23.50 - 24.50	1.32	12	12,000,000	1,827,100	0.00	15.234	8.000	23.069
24.50 - 25.50	1.22	12	12,000,000	1,689,240	0.00	14.084	8.000	24.030
25.50 - 26.50	1.13	12	12,000,000	1,561,830	0.00	13.022	8.000	24.992
26.50 - 27.50	1.04	12	12,000,000	1,443,970	0.00	12.039	8.000	25.953
27.50 - 28.50	0.96	12	12,000,000	1,335,050	0.00	11.131	8.000	26.915
28.50 - 29.50	0.89	12	12,000,000	1,234,320	0.00	10.291	8.000	27.876
29.50 - 30.00	0.42	6	6,000,000	581,790	0.00	9.698	8.000	28.602
VLONG(20.5 - 30.00)	**11.63**	**114**	**114,000,000**	**16,098,800**	**0.00**	**14.769**	**8.000**	**23.715**
Total (0.00 - 30.00)	**100.00**	**360**	**360,000,000**	**138,459,270**	**0.00**	**54.761**	**8.000**	**9.226**