Analysis of Asset Spread Benchmarks

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Introduction

This report studies the various benchmarks for analyzing the option-adjusted spreads of the major fixed income asset classes of life insurance companies. The report summarizes the key characteristics of each benchmark over economic cycles, appropriateness of the benchmark for the insurance asset class being analyzed, and historical information on the performance of the benchmark.

The report also analyzes the historical benchmark performance against default rates for the asset class being benchmarked. Various industry default data sources have been utilized for this correlation analysis.

Value of Report and Limitations

In determining reserves under the Principle Based Reserves (PBR) methodology, it is important to model the underlying assets supporting these reserves in the cash flow projections. In determining net investment returns on existing fixed income assets, the appropriate asset default costs and investment expenses need to be estimated. Default cost assumptions should be consistent with the type of asset and the quality rating of that asset. Companies performing PBR must also disclose in a supporting actuarial report the weighted-average option-adjusted spreads implied by the market values of the fixed income portfolios backing reserves. A drafting note in the PBR exposure draft indicates that it is expected that comparison of these company spreads to market spread benchmarks will provide context for evaluating the relative risk of company-specific portfolios. It is important to note that asset spreads incorporate not only default risk but other risks such as liquidity.

The scope of this report is mainly to identify appropriate benchmarks for the major insurance fixed income asset classes and analyze how the benchmark spreads are correlated with historical asset default rates. The report does not identify any benchmarks for private placement and commercial mortgages since based on our research, this information is not readily available. The report does not recommend how future default costs for existing fixed income assets of life insurance companies should be estimated based on the asset performance relative to its benchmark. The report also does not develop or recommend any solution on how reserve levels should be set to reflect the "riskiness" of the underlying assets supporting the reserves.

Distribution of General Account Invested Assets

The American Council of Life Insurers (ACLI) report on Invested Assets Portfolio Profile for year end 2005 shows the following major classes of General Account invested assets for all life insurance companies. These results were comprised from company data included in the National Association of Insurance Companies (NAIC) annual statutory filings "Summary of Investment Schedule" exhibit.

Asset Classification	Percent Distribution
Corporate and other fixed income securities	51.3
Mortgage backed securities	17.2
Mortgage loans	9.9
US and Foreign Gov't Securities, Treasuries, & Municipals	9.3
Other Invested Assets	4.7
Equities	3.8
Policy Loans	3.8
Total	100

Corporate and other fixed income securities include unaffiliated domestic and foreign securities, and affiliated securities. Mortgage backed securities include pass-through securities, commercial mortgage obligations (CMOS), and real estate mortgage investment conduits (REMICs). Mortgage loans include commercial, agricultural, and residential loans. US Municipals include states, territories, and possessions, political subdivisions of states, territories, and possessions, revenue obligations and industrial development, and industrial development.

The ACLI report also shows the distribution of invested assets by company size. While the three major asset classes remain the same, the smaller companies have a greater percentage of invested assets in mortgage backed securities and a smaller percentage in corporate securities. Smaller companies also show higher percentages of invested assets in US Treasury Securities and US Government Agencies.

The table below summarizes the distribution of invested asset by company size measured by invested assets. Asset classifications which are individually less than 5% of total invested assets are displayed in aggregate as "All Other Assets" in this table.

Asset Classification		**Percent Distribution**			
		<$1B	$1B-$10B	$10B-$50B	>$50B
Corporates		37.0	51.3	49.5	52.5
Mortgage backed securities		20.1	21.9	18.1	16.0
Mortgage Loans		-	-	11.1	10.8
US Treasury Securities		7.3	-	-	-
US Municipals		5.5	-	-	-
US Government Agencies		12.5	-	-	-
All Other Assets		17.6	26.8	21.3	20.7
Total		100	100	100	100

Table 1

Characteristics of a Benchmark

A benchmark is typically a market index which tracks the performance and provides a risk measurement of a broad asset class such as investment grade bonds, or a narrower asset class such as investment grade corporate bonds. Since indices track returns and spreads on a buy-

and-hold basis, they represent a "passive" investment approach and can provide a good benchmark against which to compare the performance of a portfolio that is actively managed. A bond index portfolio will have the same risk-reward profile as the bond market index it is tied to.

The major index publishers create indices by tracking the returns and spreads of a representative sample of securities in the asset class that the index is meant to track. Specific predetermined criteria such as size and credit rating are used to determine which securities are included in the index.

Features of a Good Benchmark

In choosing a benchmark for life insurance fixed income assets, it is important that the mix of securities comprising the index should correlate well with the associated asset class of the insurance company by duration, quality, size, and other key fixed income characteristics. Otherwise, company spreads of the asset class against benchmark spreads will be misleading.

In general, a good benchmark should meet most, if not all, of the following criteria:

- **Unambiguous and Transparent** – The names and weights of securities comprising a benchmark should be clearly defined.
- **Investable** – The benchmark should contain securities that an investor can purchase in the market or easily replicate.
- **Priced daily** – The benchmark's spreads should be calculated regularly.
- **Availability of historical data** – Past spreads of the benchmark should be available in order to gauge historical spreads.
- **Low turnover** – There should not be high turnover in the securities in the index because it can be difficult to base portfolio allocation on an index whose makeup is constantly changing.
- **Specified in advance** – The benchmark should be constructed prior to the start of evaluation.
- **Published risk characteristics** – The benchmark provider should regularly publish detailed risk metrics of the benchmark so that the investment manager can compare the actively managed portfolio risks to the passive benchmark risks.

Popular Benchmarks

For fixed income assets, the most commonly used benchmarks or indices are those created by large broker-dealers such as Lehman Brothers, J. P. Morgan, Merrill Lynch and Citigroup. Lehman Brothers appears to be very popular and their Global Family of Indices is used by the majority of US investors, a large portion of European investors, and an increasing share of Asian investors. These benchmarks satisfy all the criteria a good benchmark should possess. Within each index group, there are dozens of sub-indices providing a benchmark for virtually any bond market exposure an investor might want.

A. Lehman Brothers

Major Lehman Brother indices include the following:

i. US Aggregate Index - includes bonds from the Treasury, Government-Related, Corporate, MBS (agency fixed-rate and hybrid ARM pass-throughs), ABS, and CMBS sectors.

ii. US Commercial Mortgage Backed Securities (CMBS) Index - consists of four components; CMBS Investment-Grade Index, CMBS High-Yield Index, CMBS Interest-Only Index, and Commercial Conduit Whole Loan Index (all bond classes and interest-only classes).

iii. US Corporate High Yield Index - includes non-investment grade, fixed-rate, taxable corporate bond market.

iv. US Corporate Index – includes investment-grade, fixed-rate, taxable securities sold by industrial, utility and financial issuers.

v. US Government/Credit Index - includes Treasuries, Government-Related issues, and USD Corporates.

vi. US Mortgage Backed Securities (MBS) Index – includes the fixed-rate agency mortgage-backed pass-through securities of Ginnie Mae, Fannie Mae, and Freddie Mac.

vii. US Municipal Index – includes long term tax exempt bond market. The index has four main sectors: state and local general obligation bonds, revenue bonds, insured bonds, and pre-refunded bonds.

Greater detail of these indices can be found in Appendix A.

B. J.P. Morgan

The J.P. Morgan Government Bond Index is the most widely-used benchmark for measuring performance and quantifying risk across international fixed income bond markets.

C. Merrill Lynch

Major Merrill Lynch indices include the following:

i. US Broad Market Index - tracks the performance of US dollar denominated investment grade Government and Corporate public debt issued in the US Domestic bond market, including collateralized products such as Mortgage Pass-Through and Asset Backed securities.

The US Broad Market Index has the following sub-indices:

ii. US Domestic Master Index - tracks the performance of US dollar-denominated investment grade Government and Corporate public debt issued in the US Domestic bond market, including Mortgage Pass-Through securities but excluding Asset Backed securities.

iii. Corporate & Government Master Index - tracks the performance of US dollar-denominated investment grade Government and Corporate public debt issued in the US Domestic bond market, excluding collateralized products such as Mortgage Pass-Through and Asset Backed securities.

iv. US Treasury Index - tracks the performance of the direct Sovereign debt of the US Government.

v. Quasi & Foreign Government Index - tracks the performance of US dollar denominated investment grade public debt of Government and quasi-Government issuers, other than the direct obligations of the US Treasury, issued in the US domestic bond market.

vi. US Corporate Master Index - tracks the performance of US dollar-denominated investment grade corporate public debt issued in the US domestic bond market.

vii. Mortgage Backed Securities Index - tracks the performance of US dollar denominated 30-year, 15-year and balloon pass-through mortgage securities having at least $150 million outstanding per generic production year. A generic production year is defined as the aggregation of all mortgage pools having a common issuer (Ginnie Mae, Fannie Mae, Freddie Mac, etc.), type (30-year single family, 15-year single family, etc), coupon and production year (the year the underlying mortgages were issued).

viii. Fixed Rate Asset Backed Index - tracks the performance of US dollar denominated asset backed securities.

Some additional sub-indices representing various combinations of the primary sectors include the following:

ix. US Government Index - tracks the performance of the combined US Treasury and US Agency markets.

x. US Agency Index - tracks the performance of US dollar-denominated public debt of US Agencies, issued in the US domestic bond market.

xi. US Financial Corporate Index - tracks the performance of US dollar denominated investment grade public debt of financial sector corporate issuers, issued in the US domestic bond market.

D. Citigroup

Major Citigroup indices include the following:

i. Citigroup US Broad Investment-Grade Bond Index - tracks the performance of bonds issued in the US investment-grade bond market. The index includes institutionally-traded US Treasury, government-sponsored (US agency and supranational), mortgage, asset-backed, and investment-grade securities.

ii. Citigroup US Treasury STRIPS Index - represents a comprehensive selection of long-duration market sectors. The index offers a wider range of duration choices and can also be combined with a range of Citigroup US Broad Investment-Grade Bond Index sectors if a core spread product exposure is desired.

iii. Citigroup Agency Zero 10+ Year Index - allows better customization for investors seeking long-duration benchmarks by providing a higher-yielding benchmark alternative to Treasury STRIPS while enabling investors to maintain a high-quality benchmark.

iv. Citigroup Large Pension Fund Baseline Bond Index - provides a tracking vehicle for pension funds seeking to establish long-term core portfolios that more closely match the longer duration of their nominal dollar liabilities. This index improves on that structure by using fixed sector weights and a minimum maturity of seven years for non-mortgage issues.

Benchmarking Comparisons

For index publishers, spreads for indices are calculated based on the treasury curve, interpolated to match the maturity of each bond. Option-adjusted spreads (OAS) are slightly different among two different index publishers for securities with options because of the models used to consider the impact of options, not because of the reference curve. Generally, the OAS from different indices should be fairly consistent at the bond level, especially for corporate bonds. However, the rules to include such bonds in an index might be different between different index publishers and may contribute to differences for the OAS of the same industry index calculated by two different publishers.

The following table shows comparison of historical OAS at the end of each year of two similar indices from two different index publishers. Figures in the table are in basis points. The differences in values are negligible and do not show any particular patterns. The correlation coefficient is 99.2%, which clearly indicates that the two indices for investment grade bonds provide similar historical trends.

Date	Merrill Lynch - US Financial Corporate Index	Lehman Brothers - Invest. Grade Index: Financial Institutions	Difference
12/31/1996	59	52	7
12/31/1997	65	65	0
12/31/1998	106	116	-10
12/31/1999	102	102	0
12/31/2000	162	165	-3
12/31/2001	139	150	-11
12/31/2002	172	171	1
12/31/2003	68	72	-4
12/31/2004	67	64	3
12/31/2005	75	75	0
12/31/2006	77	69	8

Table 2

We also compared the OAS of the Merrill Lynch and Lehman Brothers indices by whole letter ratings. Again, the differences in values are generally negligible and do not show any particular pattern. All the correlation coefficients are close to 100%, which indicates a similar trend in historical OAS values.

	Merrill Lynch Indices				Lehman Brothers Indices			
Date	US Corp AAA	US Corp AA	US Corp A	US Corp BBB	Aaa Corporate	Aa Corporate	A Corporate	Baa Corporate
12/31/1996	29	41	57	83	37	40	52	82
12/31/1997	41	50	65	92	39	46	62	88
12/31/1998	62	74	101	171	58	83	100	163
12/31/1999	75	82	101	152	76	84	104	146
12/31/2000	98	130	186	266	96	134	188	264
12/31/2001	70	86	144	222	83	98	161	235
12/31/2002	102	81	133	270	104	92	166	260
12/31/2003	61	48	68	130	58	48	70	127
12/31/2004	55	54	68	113	50	43	61	109
12/31/2005	61	64	84	121	57	65	81	118
12/31/2006	56	61	84	122	53	58	80	117

Table 3

Other Benchmarking Options

Insurance companies may have investment policy constraints, such as asset/liability issues, regulatory requirements, or liquidity concerns, which may result in the necessity to construct a customized benchmark.

Typically, fixed income indices display results in terms of total rate of return, which assumes that all assets are recorded at current market values. The use of book income indices to measure performance is a relatively new practice. Merrill Lynch offers a service tailored to the needs of certain investors, such as insurance companies, who account for their fixed income investment portfolios on a historical cost basis. Merrill Lynch's Book Measured Asset

Return Indices (BookMark), provides accurate performance reporting through the application of similar accounting treatment to a specific index. The performance benchmarks can also be customized to take into consideration investment policy, and other constraints as briefly mentioned above.

Fixed income Exchange Traded Funds (ETFs) are another option for a benchmarking measure. ETFs are open-ended mutual funds which try to replicate a specific bond market index. Different ETFs offer investors the opportunity to achieve broad or targeted bond market exposure by investing in all of the securities or select a representative sample of the securities included in the index. ETFs are created and managed by financial firms, but not necessarily by the same firms that create and manage the index of which the ETF is based on. Some of the most common ETF brands are iShares, Standard& Poor's Depository Receipts (SPDRs), also known as "spiders", Diamonds, and Vipers. These brands mostly focus on equity indices, however some do include fixed income indices. Fixed income ETF share prices are generally affected by the same factors that influence bond prices.

Practical Considerations

All information is not publicly available for the indices described above. We found descriptions of the above indices on the internet; however the depth of these descriptions varied. Lehman Brothers had "Fact Sheets" on each index which went into significant detail, including the breakdown (in percentages) of the index by sector and quality. We did not find this degree of detail for the Merrill Lynch, Citigroup, and J. P. Morgan indices.

We were able to retrieve most Merrill Lynch index historical total returns and OAS information from the Bloomberg terminal. Bloomberg, which is a subscribed to service, provides the integration of real-time and historical information (on bonds, equities, commodities, currencies, and funds), research, and news reports directly into office terminals. Bloomberg does not provide historical OAS for the various Merrill Lynch indices and a separate subscription is required.

For the Lehman Brothers index, both historical total returns and OAS information is unavailable in the basic Bloomberg subscription and additional subscriptions are needed to get this data. Lehman Brothers subscribers can also access the Lehman Brothers index returns through their website.

A basic subscription to Bloomberg could cost at least $1500 a month. The costs could increase if additional information is required, such as historical spreads and returns. These services may be too expensive for smaller insurance companies with limited resources. Another possible solution would be for the SOA, AAA, or NAIC to contact the index publishers and provide the information to its members on its websites.

Correlations of Asset Default Rates with Benchmark Spreads

Under the requirements of PBR methodology, appropriate asset default costs will need to be modeled in the cash flow projections. Insurance companies will have to determine asset

default assumptions, which should be consistent with the default probabilities of their fixed income investments.

Bond default risk, also known as credit risk, is measured by several rating agencies such as Moody's Investor Services (Moody's), Standard & Poor's Corporation (S&P), and Fitch Investor Services (Fitch). These rating agencies assign letter grades to bonds of corporations and municipalities. These letter grades reflect the rating agency's assessment of the safety of the bond issue. The top rating is AAA or Aaa. Moody's adds a suffix of 1, 2, or 3 to each rating class to produce a more granular rating. The other rating agencies use a + or – modification. Those rated BBB (or Baa) or above are investment-grade bonds and lower-rated bonds are classified as junk bonds. It is not uncommon to see defaults on low-grade bond issues. It is rare for high rated bonds to default, however this does not mean that they are free of default risk.

The following table displays total bond holdings, by asset classes, for General Account invested assets for all life insurance companies as provided in the ACLI's Investment Bulletin Bond Quality Third Quarter 2006 report.

NAIC / Rating Agency	% Distribution
Class 1 (AAA, AA, A)	69.10%
Class 2 (BBB)	25.30%
Class 3 (BB)	3.30%
Class 4 (B)	1.90%
Class 5 (CCC)	0.30%
Class 6 (CC and below)	0.10%
Total	100.00%
Investment Grade	94.40%
Below Investment Grade	5.60%

Table 4

As part of this study, we looked at the correlation between the spreads on several indices and the default rates as presented in Moody's 2006 Corporate Default and Recovery Rates, 1920-2006 report. Moody's definition of default, which is intended to capture events changing the relationship between debt holders and debt issuers and ultimately subjects the bond holder to an economic loss, includes the following three types of credit events:

1. A missed or delayed disbursement of interest and/or principal,

2. Bankruptcy, administration, legal receivership, or other legal blocks to the timely payment of interest and/or principal, or

3. A distressed exchange occurs where:

    a. The issuer offers debt holders a new security or package of securities that amount to a diminished financial obligation, or
    b. The exchange had the apparent purpose of helping the borrower avoid default.

The following table compares Moody's calendar year default rates against the OAS of five Merrill Lynch indices at the end of each year. The correlations between Moody's default rates and the OAS of the five indices are generally greater than 80%. Please note that since Moody's report does not have calendar year default rates available through 2006, we have used All-rated Moody's cumulative issuer-weighted default rate by annual cohort tables to calculate the annual default rates. Also please note that severity was not incorporated into this analysis due to the difficulty in obtaining the required data.

Correlation of Moody's Annual Default Rates with Option-adjusted Spreads of various Merrill Lynch Corporate Indices

Date	Default Rate (%)	US Broad Market	Domestic Master	Investment Grade Corporates	US Financial Corporate	US Industrial Corporate
12/31/1996	0.23	0.22	0.22	0.60	0.59	0.65
12/31/1997	0.39	0.23	0.22	0.70	0.65	0.76
12/31/1998	0.59	0.52	0.51	1.19	1.06	1.33
12/31/1999	0.90	0.49	0.48	1.16	1.02	1.25
12/31/2000	1.22	0.81	0.80	2.02	1.62	2.25
12/31/2001	2.17	0.74	0.73	1.65	1.39	1.77
12/31/2002	1.73	0.65	0.63	1.88	1.72	1.93
12/31/2003	0.89	0.43	0.41	0.95	0.68	1.10
12/31/2004	0.48	0.34	0.34	0.83	0.67	0.95
12/31/2005	0.36	0.47	0.45	0.92	0.75	1.05
12/31/2006	0.36	0.42	0.41	0.91	0.77	1.03
Correlation with Default		**0.808**	**0.806**	**0.833**	**0.828**	**0.806**

Table 5

Table 5 shows that all-rated annual default rates are highly correlated to the OAS of corporate indices. The indices used above are described in more detail in Appendix B, and indices related to government issues, foreign investment environments or mortgage market have been excluded from the correlation analysis.

Since most life insurance fixed income assets are high grade bonds, we also ran a correlation between the OAS of the five Merrill Lynch indices against Moody's investment grade annual default rates. The results in Table 6 again show high levels of correlation.

Correlation of Moody's Annual Default Rates with Option-adjusted Spreads of various Merrill Lynch Corporate Indices

Date	Default Rate (%)	US Broad Market	Domestic Master	Investment Grade Corporates	US Financial Corporate	US Industrial Corporate
12/31/1996	-	0.22	0.22	0.60	0.59	0.65
12/31/1997	0.02	0.23	0.22	0.70	0.65	0.76
12/31/1998	0.02	0.52	0.51	1.19	1.06	1.33
12/31/1999	0.17	0.49	0.48	1.16	1.02	1.25
12/31/2000	0.25	0.81	0.80	2.02	1.62	2.25
12/31/2001	0.58	0.74	0.73	1.65	1.39	1.77
12/31/2002	0.47	0.65	0.63	1.88	1.72	1.93
12/31/2003	0.17	0.43	0.41	0.95	0.68	1.10
12/31/2004	0.04	0.34	0.34	0.83	0.67	0.95
12/31/2005	0.09	0.47	0.45	0.92	0.75	1.05
12/31/2006	0.06	0.42	0.41	0.91	0.77	1.03
Correlation with Default		**0.776**	**0.772**	**0.794**	**0.794**	**0.762**

Table 6

Correlation analysis is also performed on the OAS of several major Lehman Brothers' indices against Moody's investment grade annual default rates. The results in Table 7 show high levels of correlation similar to the Merrill Lynch indices.

Correlation of Moody's Annual Default Rates with Option-adjusted Spreads of various Lehman Brothers' Corporate Indices

Date	Default Rate (%)	Global Aggregate	U.S. Aggregate	US Corporate 10+ years	US Corporate 3-5 years	U.S. Corporate Investment Grade
12/31/1996	-		0.28	-	-	0.59
12/31/1997	0.02		0.24	-	-	0.58
12/31/1998	0.02		0.44	0.11	0.09	0.95
12/31/1999	0.17		0.52	1.25	1.03	1.03
12/31/2000	0.25	0.45	0.81	2.00	1.43	1.61
12/31/2001	0.58	0.42	0.80	1.97	1.58	1.72
12/31/2002	0.47	0.41	0.74	2.07	1.86	1.97
12/31/2003	0.17	0.29	0.53	1.47	1.07	1.27
12/31/2004	0.04	0.23	0.42	1.20	0.75	0.92
12/31/2005	0.09	0.23	0.40	1.23	0.78	0.90
12/31/2006	0.06	0.25	0.42	1.30	0.71	0.90
Correlation with Default		**0.840**	**0.878**	**0.773**	**0.867**	**0.910**

Table 7

To understand how the OAS of lower rated investment grade bonds correlates with the all-rated default rates, we did two correlation analyses:

1. Merrill's BBB historical spreads against Moody's all-rated default rates.
2. Lehman's Baa historical spreads against Moody's all-rated default rates.

The results in Table 8 again show high levels of correlation.

Correlation of Moody's Annual Default Rate with lower rated indices

Date	Default Rate (%)	Lehman's Baa Corporate Index	Merrill's US Corp BBB Index
12/31/1996	0.23	0.89	0.83
12/31/1997	0.39	0.78	0.80
12/31/1998	0.59	1.25	1.33
12/31/1999	0.90	1.45	1.57
12/31/2000	1.22	2.08	2.16
12/31/2001	2.17	2.30	2.27
12/31/2002	1.73	2.83	2.82
12/31/2003	0.89	1.76	1.85
12/31/2004	0.48	1.24	1.26
12/31/2005	0.36	1.24	1.28
12/31/2006	0.36	1.19	1.22
Correlation with Default		**0.910**	**0.899**

Table 8

We also attempted to analyze the OAS of private placement bond indices with private placement default rates; however, the Bloomberg terminal does not provide any historical information on the OAS of private placement bond indices. As a proxy, we continued to use the OAS of Merrill Lynch Corporate Indices since private placement bonds are included in the calculation of the historical OAS of corporate indices. The Private Placement Bond annual

default rates have been extracted from the "*1986-2002 Credit Risk Loss Experience Study: Private Placement Bonds*" published by the SOA Private Placement Committee. We were only able to get default rates of private placement bonds from 1996 to 2002. As shown in Table 9, there is a moderate level of correlation..

Correlation of Private Placement Bonds Annual Default Rates with Option-adjusted Spreads of various Merrill Lynch Corporate Indices

Date	Default Rate (%)	US Broad Market	Domestic Master	Investment Grade Corporates	US Financial Corporate	US Industrial Corporate
12/31/1996	0.75	0.22	0.22	0.60	0.59	0.65
12/31/1997	0.35	0.23	0.22	0.70	0.65	0.76
12/31/1998	0.50	0.52	0.51	1.19	1.06	1.33
12/31/1999	0.87	0.49	0.48	1.16	1.02	1.25
12/31/2000	0.93	0.81	0.80	2.02	1.62	2.25
12/31/2001	1.76	0.74	0.73	1.65	1.39	1.77
12/31/2002	2.39	0.65	0.63	1.88	1.72	1.93
Correlation with Default		**0.580**	**0.572**	**0.675**	**0.749**	**0.612**

Table 9

Conclusion

In conclusion, there are several published indices, which could be used to compare investment spreads of fixed income assets of insurance companies. Any of the major indices described in this report could be chosen as a benchmark and it would not be difficult for insurance companies to disclose their asset spreads relative to these benchmarks. The more difficult question to answer is the relationship between asset spreads over a given benchmark and its implications on potential asset defaults. The correlation of historical option-adjusted spreads of various indices with asset default rates appears significant in the few examples we have illustrated in this report. However, due to the unavailability of OAS data before 1996, the reference period is for the past eleven years only for most of the comparisons. For private placements, the default rates are only available up to 2002, and since the OAS data is only available from 1996 onwards, the reference period is only from 1996 to 2002.

In order to provide regulators and PBR reviewers with a basis to evaluate an individual company's asset spreads and make comparisons between companies, more structure should be provided on the following:

1. How to identify the benchmarks for company-specific asset classes to incorporate not only default risk, but other risks such as liquidity;
2. How to identify the time horizon over which the OAS is calculated (as of year end, or the average OAS for the past month, quarter, or calendar year)

Further work also needs to be done to develop an actuarially sound and consistent approach to create different asset default assumptions and underlying reserves based on an insurance company's asset spreads relative to a benchmark.

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