



Practitioner Considerations for Guideline Excess Spread Attribution Methodology under Actuarial Guideline LIII (AG53)

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Introduction

NAIC Actuarial Guideline LIII (“AG 53”), effective for year-end 2022, requires Appointed Actuaries for non-exempted life insurers to disclose detailed information about investment activities and risks, focusing primarily on assets used to support Asset Adequacy Testing. The greater degree of disclosure and transparency will enable regulators to better understand the investment risks included in insurers’ balance sheets. The riskiness of investments has become a topic of increasing concern as insurance investment holdings have become more complex.

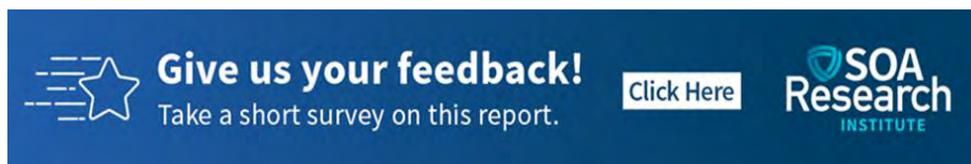
A section of AG 53 (section 5.B.) requires an attribution of Net Market Spreads¹ in excess of an Investment Grade Net Spread Benchmark for many “complex” assets.

While the use of attribution analysis in some areas of investment practice, such as performance attribution, is a long-standing and well-established practice, there currently is no broadly accepted quantitative construct to decompose market spreads into component pieces. Historically there has been no requirement to attribute spreads or changes in spreads to individual risk components. The introduction of AG 53 necessitates the development of a methodology to conduct spread attribution.

The Society of Actuaries engaged Actuarial Risk Management to produce this resource for practitioners. The report describes general principles to inform the development of a methodology to attribute spread to different investment risks. This paper will list and define a number of risks that are inherent in fixed income investments. Many of these risks could serve as the components of an attribution. **Please note we are using the term “general principles” to convey considerations that can aid a practitioner. This paper is in no way intending these general principles to be perceived as any type of standard or requirements related to AG 53.**

The paper is also not intended to create a specific methodology to attribute Guideline Excess Spread² nor does it develop a “safe harbor” approach.

The documentation requirements for AG 53 can be found at <https://content.naic.org/sites/default/files/inline-files/AG%2053.pdf>. The principles will build on financial industry research and analytics where practical.



¹ Net Market Spread: For each asset grouping, shall mean the spread over comparable Treasury bonds that equates the fair value as of the valuation date with modeled cash flows, less the default assumption used in asset adequacy analysis. (Definition directly from AG 53)

² Guideline Excess Spread: The net spread derived by subtracting the Investment Grade Net Spread Benchmark from the Net Market Spread for non-equity-like instruments. Investment expenses shall be excluded from this calculation. (Definition directly from AG 53)

Section 1: Background on Actuarial Guideline LIII (“AG 53”) and the Requirement for Guideline Excess Spread Attribution

AG 53, adopted by the NAIC Life Insurance and Annuities (A) Committee on July 20, 2022 and effective for year-end 2022, is “intended to provide uniform guidance and clarification of requirements for the appropriate support of certain assumptions for asset adequacy analysis performed by life insurers”³.

One key focus of AG 53 is on “Projected High Net Yield” (PHNY) assets, defined in Section 4.F. of the guideline as follows:

- F. Projected High Net Yield Assets. Currently held or reinvestment assets that are either:
- i. An Equity-like Instrument assumed to have higher value at projection year 10 or later than under an assumption of annual total returns, before the deduction of investment expenses, of 4% for the first 10 projection years after the valuation date followed by 5% for projection year 11 and after. Aggregation shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model, or
 - ii. Assets other than Equity-like Instruments where the assumed Guideline Excess Spread is higher than zero. In addition:
 - (a) Aggregation of the comparison between the assumed Net Market Spread from each asset and the Investment Grade Net Spread Benchmark shall be done at a level of granularity that is consistent with or more granular than how the assets are grouped, i.e., compressed, in the asset adequacy analysis model.
 - (b) For applicable assets that do not have an explicit WAL or term to maturity, the Appointed Actuary shall disclose the method used to determine the appropriate WAL used for comparing to the Investment Grade Net Spread Benchmark.
 - (c) For purposes of the comparison between the assumed Net Market Spread from each asset and the Investment Grade Net Spread Benchmark, investment expenses shall be excluded.

Note: “WAL” is Weighted Average Life, weighted average time to receipt of principal from an investment.

Under AG 53, non-equity (fixed income) investments with a Net Market Spread greater than that of the Investment Grade Net Spread Benchmark are subject to a greater degree of scrutiny. The expected performance of such investments is of particular interest and as such requires disclosure of an attribution by source of the Net Market Spread over the Investment Grade Net Spread Benchmark. Note that the Guideline Excess Spread attribution is required for both existing assets and assumed reinvestment asset purchases.

It is noted in Section 3.F.iii. of AG 53 that cash or equivalents, Treasuries, and agency bonds as well as Public non-convertible, fixed-rate corporate bonds with no or immaterial callability are excluded from the Guideline Excess Spread attribution requirement.

This Guideline Excess Spread attribution is focused on understanding the sources of risk and return. Many of these sources of risk (see Section 5) have increased in magnitude on insurer balance sheets greatly over the past few decades. There is increased complexity, breadth, and magnitude of insurer investments, and disclosure is required in Section 5.B. under AG 53:

³ National Association of Insurance Commissioners. Actuarial Guideline LIII — Application of the Valuation Manual for Testing the Adequacy of Life Insurer Reserves. naic.org, October 6, 2022, [AG 53.pdf \(naic.org\)](#) (accessed October 6, 2022).

B. For projected high net yield assets for non-equity-like instruments, either currently held or in assumed reinvestments, perform and disclose the following attribution analysis steps at the asset type level associated with the templates in Section 6:

- i. State the assumed Guideline Excess Spread.
- ii. Estimate the proportion of the Guideline Excess Spread attributable to the following factors:
 - (a) Credit risk
 - (b) Illiquidity risk
 - (c) Deviations of current spreads from long-term spreads defined in Appendix 1
 - (d) Volatility and other risks (identify and describe these risks in detail)

AG53-6

Appendix C

AG LIII

- iii. Provide commentary on the results of Section 5.B.ii. Also, where judgment is applied, provide supporting rationale of how the expected return in excess of the Investment Grade Net Spread Benchmark is estimated.

Guidance Note: A best-efforts approach is expected for the year-end 2022 attribution analysis.

Section 2: Objectives for Developing Principles for Attribution Analysis

Guideline Excess Spread attribution analysis requires an Appointed Actuary to develop an appropriate methodology. The authors used the following objectives to develop general principles to aid Appointed Actuaries in this analysis.

1. The principles can be universally and consistently applied to all life insurers and all types of fixed income investments.
2. The principles are expected to remain valid for any stage of the economic cycle and be applicable to any new fixed income investment classes that insurers may hold in their general account.
3. The principles are to be as objective and unbiased as possible notwithstanding areas of subjectivity and professional judgment that recognizes spread attribution analysis continues to mature.
4. The principles are likely to evolve as lessons are learned over time with meeting the requirement.
5. The principles are consistent with statutory valuation rules and companies' investment valuation frameworks.
6. The principles are consistent with other applications of quantifying investment risk utilized in other financial reporting activities (e.g., ASC 326 Current Expected Credit Losses or "CECL").

Section 3: Challenges and Limitations

There are a number of challenges and limitations to developing and implementing an attribution methodology. The following are key challenges and limitations:

Lack of Previous Research: We are not aware of any research on fully decomposing market spreads into component pieces. The limited available research is driven at least in part by a lack of demand for spread attribution – there has been very limited demand for understanding spread decomposition from investors. While many investors utilize certain market benchmarks to understand marginal compensation for marginal risk taking, research on spread attribution has to date been very limited. Many analyses utilized to understand risks are more focused on what happens if a risk becomes realized (e.g., stress tests, VaR) and less so on what compensation is being received for the risk being assumed.

Lack of Data: While there is an increasing amount of market spread data that is available, it is largely focused on the more liquid sectors of the investment markets. AG 53 – while not excluding more liquid parts of the fixed income market – is more focused on increasingly complex assets. Therefore, AG 53's focus is on the less liquid parts of the fixed income markets and thus areas with less available data.

Non-Comparability of Data: Due to insurers employing different methodologies and market practices to determine spreads, the spreads and resulting spread attribution analyses may not be comparable across life insurance companies.

Lack of/Inconsistent Understanding: There is a wide range of views of market participants. Because of the wide range of knowledge, expertise, and perspectives, efforts to increase the consistency and comparability of analyses across the industry may be beneficial.

Granularity of Attribution: In developing a methodology, there are likely to be tradeoffs between the number of attribution buckets, the complexity of the attribution analysis and the usefulness of the analysis. The choice of risk(s) that each bucket covers will drive some of the complexity of the spread attribution analysis. There is the potential that chosen buckets will overlap, adding complexity to the analysis to account for such redundancies. Additionally, when spread attributions are aggregated, for example from the CUSIP level to the rows shown in the AG 53 template, there may be some degree of useful information lost. An example of this may be positive attributions offsetting negative attributions.

Variety of Asset Classes and Types of Risk: There are a wide range of both asset types and types of risk that must be considered in the spread attribution. Many of these asset types are fairly new and may have an increasing level of complexity which leads to not all risks being known or fully understood.

Section 4: Market Spreads - Overview

In order to perform spread attribution, it is first important to understand what market spreads are and how they are related to other key market metrics and analytics. The objective of this section is to provide a common base of understanding for practitioners.

4.1 RELATIONSHIP BETWEEN PRICE, RISK-FREE RATE, AND SPREAD

There is a direct, formulaic relationship between the price, assumed cash flows, underlying risk-free rate, and market spread of a fixed income investment:

$$\text{Price} = \sum_{t=1}^T \frac{\text{Coupon}_t}{(1 + \text{Risk-Free Rate} + \text{Spread})^t} + \frac{\text{Principal}_t}{(1 + \text{Risk-Free Rate} + \text{Spread})^t}$$

Companies determine price, cash flows, and risk-free rates for each investment, then calibrate the spread that replicates the price. Each company has their own processes around each of these inputs (price, cash flows, and risk-free rates), and the resulting input variation may lead to variation of market spreads across the industry for identical investment holdings:

- **Price:** In many cases, especially for publicly traded assets, prices are provided by various pricing services. For publicly traded assets, there should be a high degree of consistency of the price assumed among investors for any individual holding. In other cases where there is a limited market (e.g., private placements), the investor may determine the price based upon a model (“mark-to-model”) with various inputs.
- **Cash flows:** For certain fixed income investments without embedded options, cash flows are contractually fixed. For structured assets (e.g., asset-backed securities, structured credit) and other assets with embedded options, cash flows will be more difficult to project and are heavily model- and assumption-dependent. For these types of assets, there may be a wider range of assumed cash flows among investors. Modeled cash flows used in asset pricing utilizing the formula above are expected to be best-estimate, single-path deterministic, and before any considerations of default risk. Investment expenses are not included in asset level cash flows for this purpose.
- **Risk-free rate:** This is the market yield on a Treasury security with the same or similar weighted average life (WAL) as the fixed income investment being considered. To be consistent, the risk-free yield must be determined as of the same date and time as the asset price.
- **Spread:** This is the addition to the risk-free rate that results in a discount rate equating the present value of cash flows to the price of the investment.

4.2 VALUATION FRAMEWORK

A formalized valuation framework provides structure and guidance on how fair values (prices) for investments are determined. Related, ASC 820-10 for US GAAP categorizes and requires disclosure on securities based on how their fair values are determined. There are three categories of fair value inputs under ASC 820-10⁴:

- **Level 1:** Quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity can access at the measurement date.
- **Level 2:** Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.
- **Level 3:** Unobservable inputs for the asset or liability.

Prices based upon Level 1 inputs are most common for Treasuries, common stocks, mutual funds and ETFs. Prices including Level 2 inputs are the most common pricing approach for insurance company investments and it is applicable to most publicly traded securities. Prices including Level 3 inputs are more common for privately issued investments which are becoming a larger proportion of insurer balance sheets.

Consistency is an important consideration between a company's valuation framework and the spread attribution. This is of particular note for assets that are mark-to-model⁵ and are heavily dependent upon company-provided assumptions (e.g., US GAAP Level 3 assets). The derivation of the market spreads used to determine fair values are consistent with the spread attribution disclosed for AG 53.

⁴ Financial Accounting Standards Board. Fair Value Measurement (Topic 820). Fasn.org, June 30, 2022, [820-10 Overall \(fasn.org\)](https://www.fasn.org/820-10-Overall) (accessed November 25, 2022).

⁵ Mark-to-model: The practice of pricing an asset using a financial model instead of utilizing a market price.

Section 5: Types of Asset Risk and Relationship to Spread

While it is not plausible to identify all of the risks in an insurer's investment portfolio, there are a number of common risks in life insurer fixed income portfolios. A risk spread, that is incremental to the risk-free rate, compensates investors for known and some unknown risks. Generally, the more of a specific risk that an asset contains, the larger the spread that will be attributed to that specific risk for that asset.

5.1 TYPES OF RISKS THAT CAN LEAD TO ASSET LOSS

Below is a comprehensive, but not exhaustive, list and definitions of different types of fixed income investment risks that may impact spreads. Not all risks are mutually exclusive, so there may be overlap between different risks. The first two risks listed below are specifically identified in the AG 53 templates. The risks that follow the first two are listed alphabetically.

- **Credit risk:** Risk that an asset defaults, experiences a reduction in expected recovery amount or is downgraded by a credit rating organization
- **Illiquidity risk:** Risk that an investor can only sell an asset at less than its true value or cannot be sold at all; generally driven by a wider bid-ask spread
- **Call / prepayment risk:** Risk that an asset is called or prepaid by the issuer or borrower and the investor must reinvest proceeds in a lower rate environment than the original investment was purchased
- **Complexity risk:** Risk that an asset is more difficult to analyze and model, requiring more time and expense to understand the asset and limiting the pool of investors interested in investing in the asset, thus decreasing demand and lowering the price that an asset could otherwise receive in an open market
- **Event risk:** Risk that asset values are adversely impacted by a single event such as a natural disaster, industrial accident or corporate takeover
- **Exchange-rate / currency risk:** Risk that a non-US dollar denominated asset declines in value due to adverse currency rate movements
- **Inflation / purchasing power risk:** Risk that higher than expected inflation erodes the purchasing power of a fixed income asset's cash flows
- **Interest rate risk:** Risk that interest rates increase and the value of the asset declines
- **Political / legal risk:** Risk that actions of a government adversely affect the value of an asset
- **Sector risk:** Risk of an adverse differential movement of all assets in one sector relative to another
- **Structure risk:** Risk that timing of cash flows differs from expected
- **Volatility risk:** Risk that the value of an asset with an embedded option declines due to changes in implied volatility

5.2 OTHER FACTORS THAT MAY AFFECT PRICE AND SPREAD

There are other factors that may impact the price and spread of an asset. While these may not be considered risks per se, they may impact asset valuation.

Private origination: If assets are privately originated, there is generally a limited or exclusive market and therefore pricing may be more favorable to the originator than in an efficient market. This means that assets may be acquired for a lower value and therefore with a higher spread.

Newer asset class: Early adopters of investing in certain asset classes often enjoy higher spread and/or returns before other investors become more comfortable with the asset class. Newer asset classes do not always ultimately end with lower spreads as sometimes the riskiness of an asset class is underappreciated, and as risks are better

understood, the market reprices spreads to the better understood levels of risk. In other cases, risks are less than originally thought, and subsequently as demand increases, prices rise and market spreads narrow.

Information asymmetry: This occurs when there is an imbalance of knowledge and/or expertise between buyers and sellers of an asset. The asymmetry can favor either the buyer or the seller.

Section 6: Principles for Attribution Analysis

While this whitepaper does not propose any specific methodology, this section describes a set of principles that an Appointed Actuary can utilize to help in developing a methodology and performing the Guideline Excess Spread attribution as required by AG 53. As stated earlier in the document, the following are not intended as standards or specific requirements for conducting the analysis. All of the general principles have been developed by the authors and are not requirements of AG 53.

6.1 PRINCIPLES

GENERAL / BACKGROUND

1. Overall general consistency with conducting other analyses under Actuarial Standards of Practice set the framework for performing the Guideline Excess Spread attribution.
2. Professional actuarial judgment (as per ASOP No. 1, Section 2.9) is an aspect of this analysis because this is an emerging area with limited historical practice within investment management.
3. Subject matter experts are an important resource for an Appointed Actuary to consult with, as necessary, because of their special knowledge and the nature of the analysis.

RISK IDENTIFICATION

4. Consistency of risks identified in a company's AG 53 report with risks identified in ORSA, investment policy, risk appetite, and other related company documents is an important objective.
5. It is useful to identify risks for each asset class prior to quantifying Net Market Spread risk components.
6. Asset classes do not necessarily all have the same risks, so the Guideline Excess Spread attribution components may vary by asset class.
7. It is very unlikely that any single risk will constitute the entirety of a single investment's risks.
8. Each identified risk may not need to be a separate attribution category. It may be more useful for related risks to be grouped together into a single attribution category for the spread attribution analysis.

RISK QUANTIFICATION

9. The amount of Net Market Spread attributed to a particular risk may cover both the best-estimate "cost" of that risk as well as any adjustments for uncertainty related to that risk.
10. All Net Market Spreads are measured relative to risk-free rates, so all risks are evaluated relative to risk-free assets.
11. Certain risks may be evaluated for exclusion in the Guideline Excess Spread attribution, as they either have been accounted for before spreads are determined or are risks that do not impact market spreads. Examples:
 - a. Interest rate risk, as defined in Section 5.1, may be considered for exclusion as a spread attribution category as this risk is compensated for as part of the underlying risk-free yield and not as part of the Net Market Spread.
 - b. Asset-liability management (ALM) risk may be considered for exclusion as a spread attribution category as it is the result of mismatches between assets and liabilities and will be unique to each company. The market value and spread of an asset are independent of an investor's ALM position.
12. Given that many risks are correlated, correlations are a component of the attribution analysis to consider.
13. Guideline Excess Spread attribution components may be negative. This would imply that a particular risk of an asset or asset class (as represented by the spread attribution of an asset) is less than that of the Investment Grade Net Spread Benchmark. An illustrative example is included in Appendix B.
14. A material amount of the Guideline Excess Spread may be attributed to identified risks including the impact of any correlation among risks. Minimizing the amount of Guideline Excess Spread not attributed to specific identified risks is an overall objective

15. When looking to history to develop assumptions, it is important to recognize that historical metrics may not be predictive.

AGGREGATION AND PRESENTATION

16. Presentation of Guideline Excess Spread attribution at the asset class level in the provided templates should reasonably reflect the risks included in the holdings for each asset class. The methodology used in determining and/or aggregating spread attribution across the individual investments underlying each row in the template should be reasonable and not biased by the choice of presentation or aggregation.

FUTURE CONSIDERATIONS

17. Spread attribution methodologies may evolve as new asset classes are added to insurers' investment portfolios and also as characteristics of asset classes evolve through time.
18. Spread attributions may not be static through time. The spread attributed to a specific risk can vary as economic and market conditions change.

6.2 OTHER CONSIDERATIONS

Below is a list of other considerations for the Appointed Actuary in performing the Guideline Excess Spread attribution analysis:

- Degree of granularity: While this attribution analysis can be performed at the individual asset level, there is no requirement to perform this analysis (nor disclose it) at the individual asset level. There are likely approaches where reasonably similar investments will be grouped together for this exercise.
- Number of attribution categories chosen: The template includes Credit and Illiquidity risks, leaving additional attribution categories to the judgment of the Appointed Actuary.
- Degree of judgment: For asset types with less available information, the attribution will be more challenging and require a greater degree of professional actuarial judgment.
- Additional analysis: An Appointed Actuary may want to perform additional scenario projections depending on the results of the Guideline Excess Spread attribution analysis. For example, if an Appointed Actuary identifies a significant amount of spread being attributed to illiquidity, they may want to perform some sensitivity or stress tests around liquidity risk. This can be with higher or lower spreads or other factors depending upon the risks and conditions of additional scenarios tested.

Section 7: Ideas for Follow-up Research

While this research paper can provide useful information to an Appointed Actuary in complying with AG 53, there are many areas of additional research that are not covered by this paper and may be useful in the future. A partial list of ideas for follow-up research are below:

- Covenants in assets with credit risk vary in their specific elements and strength
- Impact of credit ratings issued by various rating agencies
- Correlations among different risk factors
- Additional ways to leverage the spread attribution analysis beyond the requirement in AG 53 (e.g., asset allocation analysis, investment portfolio construction)
- Specific methodological approaches to spread attribution and development of an accepted industry methodology as a “safe harbor”
- Survey of current practices resulting in publication of a practice note



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Section 8: Acknowledgments

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Appendix A: Guideline Excess Spread Attribution Templates

Below is a link to the templates as provided by the NAIC. Part of the template focused on Guideline Excess Spread attribution is illustrated below.

TEMPLATES – link: [AAT AG Templates - 090822.xlsx](#)

Asset Type	Net Market Spread	IG Net Spread Benchmark ¹	Guideline Excess Spread	Excess Spread Components Related to Each Risk							Check
				Credit Risk	Illiquidity Risk	[Other Risk Component #1]	[Other Risk Component #2]	[Other Risk Component #3]	[Other Risk Component #4]	[Other Risk Component #5]	
Treasuries and Agencies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Public Corporate Bonds	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Convertible Bonds	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Floating Rate Notes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Municipal Bonds	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Other Private Bonds	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Agency Mortgage Backed Securities	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Non-Agency Commercial Mortgage Backed Securities	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Non-Agency Residential Mortgage Backed Securities	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Collateralized Loan Obligations	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Other Asset Backed Securities	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Equities or Equity-Like Instruments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Real Estate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Mortgage Loans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Schedule BA Assets	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Derivative Instruments linked to Equity-Like Instrumen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Other Derivative Instruments	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE
Other - Not Covered Above	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	TRUE

(1) "IG Net Spread Benchmark" = Investment Grade Net Spread Benchmark

Additional Commentary

Appendix B: Illustrative Example of Spread Attribution with Negative Guideline Excess Spread Components

				<i>Spread Components Related to Each Risk</i>				
Asset Type	Net Market Spread			Risk Factor A	Risk Factor B	Risk Factor C	Risk Factor D	Other Risk Factors / Unallocated
Asset Class XYZ	2.5%			0.3%	0.7%	0.5%	0.8%	0.2%
IG Net Spread Benchmark	1.5%			1.0%	0.5%	0.0%	0.0%	0.0%
				<i>Excess Spread Components Related to Each Risk</i>				
Asset Type	Net Market Spread	IG Net Spread Benchmark¹	Guideline Excess Spread	Risk Factor A	Risk Factor B	Risk Factor C	Risk Factor D	Other Risk Factors / Unallocated
Asset Class XYZ	2.5%	1.5%	1.0%	-0.7%	0.2%	0.5%	0.8%	0.2%

Risk Factor A has a negative Excess Spread Component in this illustrative example as Asset Class XYZ has less net Market Spread attributed to it (0.3%) than the Investment Grade Net Spread Benchmark (1.0%).

Appendix C: Potential Sources of Information

There are a number of sources of information – both subject matter experts and vendor systems – as well as market analytics which may be useful in performing this analysis.

POTENTIAL RESOURCES

There are a number of resources that an Appointed Actuary can utilize in performing the Guideline Excess Spread attribution. First, as this is a fairly technical analysis, subject matter experts are an important resource for conducting the analysis. Subject matter experts can be internal (e.g., portfolio managers, investment traders, asset class specialists, asset pricing specialists) and/or external (e.g., consultants). Additionally, investment analytical systems may have useful analytics that may be utilized in the attribution.

MARKET ANALYTICS

There are a number of existing and widely accepted market metrics that may be useful in the attribution analysis. While there is likely no single system or set of metrics that would directly allow the Appointed Actuary to perform the entire attribution, the metrics below may be useful for pieces of the attribution analysis:

CREDIT-RELATED

- **VM-20 Table A** (Baseline Annual Default Costs) ([pbr-2021-table-a-baseline-annual-default-costs.xlsx](#) ([live.com](#))): NAIC-derived annual default costs used by many companies in Principles-Based Reserves (and related) work. Derived from Moody's Corporate Bond Default Study data.
- **Probability of Default (PD)**: This is a quantitatively derived likelihood that a bond will default over a specified time horizon, based upon companies with similar characteristics at similar points in the economic and credit cycles. Many PDs are for a 1-year horizon. Others are through-the-cycle, intended to reflect an entire economic cycle. There are a number of PD models, the most well-known is the Merton model.
- **Loss Given Default (LGD)**: This is the loss, expressed as a percent of par, for a bond that defaults. It is equivalent to $(100\% - \text{recovery rate})$.
- **Credit Default Swap (CDS)**: A financial derivative that provides default protection against a bond issuer. CDS can either be bought (buying protection) or sold (selling protection, which is equivalent to adding credit risk). Most CDS are originally contracted for 5-year tenors. Prices on most CDS are generally expressed in bps per year per dollar of notional value that the buyer pays to the seller.

Note: Since the majority of pure credit risk on life insurer balance sheets (e.g., public corporates) is out of scope for the Guideline Excess Spread attribution, and the CDS market is primarily on public corporates, there may be limited direct applicable information for CDS on assets that are the focus of AG 53. However, there are takeaways and learnings that could be applied when comparing CDS vs. asset spreads. Additionally, CDS can help inform any attribution of the Investment Grade Net Spread Benchmark.

VOLATILITY / CALL / PREPAYMENT-RELATED

- **Option-adjusted spread (OAS)**: market spread based on a stochastic analysis, as opposed to a single deterministic path; as the name states, adjusts for embedded optionality in an asset; historically has been performed using swap rates
- **Zero-volatility spread (ZVS or Z-spread)**: a special case of OAS where volatility is zero and all paths collapse into a single spot rate curve; similar to nominal spread except cash flows discounted using spot rates instead of a single risk-free yield – also uses swap rates instead of Treasuries

LIQUIDITY-RELATED

- **Liquidity Credit Score (LCS):** a quantitative framework developed by Barclays ([BARCLAYS RESEARCH](#) [\(barcap.com\)](#)) that quantifies hypothetical transactions costs
 - There is a very strong correlation between a bond's market spread and LCS
 - LCS is not a spread but could be used to develop a quantitative relationship that converts it into a spread component

Appendix D: Other Practical and Technical Implications

There are a number of practical and fairly technical issues that an Appointed Actuary may come across in performing this analysis. Below is a partial list of some of these issues:

- Different market conventions on quoting yield and spread
 - Day count differences
 - Treasury: ACT/ACT
 - Corporates: 30/360
 - Spreads quoted off underlying Treasury
 - Corporates: maturity or WAL
 - ABS: closest on-the-run Treasury
- Periodicity of payments
 - Treasury / US Corporates: semi-annual
 - Structured assets: primarily monthly or quarterly
- Mixing different yield curves, option pricing models, etc. that are inputs to spread
 - Example: using OAS and ZVS (based off swaps curve) is not directly comparable to a nominal spread to Treasuries

These are likely rounding errors relative to broader attribution assumptions that a company must make but are worth considering and incorporating into the initial analysis.

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