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Context Is Key: Deconstructing Expected Loss

We believe ILS managers must consider the nuances inherent in standard catastrophe bond modeled risk metrics when constructing portfolios.

Expected Loss (EL) is one of many metrics used to quantify risk and is the basis for pricing in the catastrophe (cat) bond market. However, should all ELs be treated equally? We provide some guidance below.

What Is Expected Loss?

During the marketing phase of a cat bond, third-party vendors produce modeled risk metrics based on transaction characteristics, such as structure and the covered peril region like "U.S. hurricane."

One such metric is the EL, which represents the modeled average annual loss for a transaction. As a long-term modeled average based on many simulated years, it reflects only a probabilistic view of loss and not a definitive outcome. In other words, if an investor were to deploy $100 into a cat bond with an EL of 1% repeatedly over many thousands of simulated years, the expectation would be an average annual loss of $1; of course, due to the risk profile of cat bonds, the majority of those years would result in a zero loss and some would result in a loss higher than $1, including some with full-loss ($100) years.

Industry Index and Indemnity Triggers

A central feature of a cat bond is its trigger type, which defines the mechanism that would cause a principal reduction in the bond following an event. Understanding how each trigger operates is essential to forming a comprehensive view of a transaction.

Today, approximately 74% of the total cat bond market consists of transactions with "indemnity" triggers, while "industry index" accounts for 21%, and the small remainder are "parametric."[1] Indemnity and industry index trigger definitions are as follows:

- **Indemnity or Ultimate Net Loss (UNL):** Actual losses incurred by the counterparty (e.g., the insurer, typically referred to as the "cedant" or "issuer"); modeled using the counterparty's portfolio of insured assets.
- **Industry Index:** Estimated losses to the entire insurance industry, determined by an independent claim-reporting service, such as Property Claims Services (PCS); modeled using a vendor (e.g., Verisk) reconstruction of the insurance industry's exposure to the transaction's covered peril region.

Model Considerations

Idiosyncratic Risk

Idiosyncratic risk refers to the unique risks that arise from the specific characteristics of an individual cedant; for example, the portfolio composition of a smaller, more specialized insurer may differ significantly from that of a typical national carrier; a specialty insurer's portfolio may contain a high proportion of valuable assets such as fine art and jewelry; and a regional insurer may have an outsized share of local exposure relative to competitors, resulting in higher concentration risk.

A further potential source of idiosyncratic risk is the cedant's approach to claims handling and settlement, particularly if these processes have not been fully tested following a significant loss event. This is especially pertinent to new bond sponsors, which may also lack a proven underwriting track record. How effectively the cedant manages claims after a significant event will impact both the severity of the ultimate loss and the length of time capital remains "trapped" while the final loss is determined.

One must critically analyze the ability of cat models to capture these and other sources of risk, which have the capacity to become significant, with a potentially material impact on returns. We believe that cat models that are validated against claims data for the entire industry are better at capturing typical insurance portfolios and behaviors, and care should be taken when assessing outlier portfolios.

Peril Region

Another key feature of a cat bond is its covered peril region(s), commonly categorized into either "peak" perils[2] (such as U.S. hurricane and U.S. earthquake) or other perils (such as U.S. wildfire and U.S. severe convective storm).

Approximately 81% of the total industry index bond market provides coverage exclusively for peak perils, in contrast to 47% for indemnity bonds.[3] Some reasons for this difference include broader market acceptance, and availability of both third-party index providers and industry exposure databases (used for modeling industry index deals) for peak peril regions.

[1] Source: Neuberger ILS analysis as of October 1, 2025. Based on market value and includes coupon-paying 144A notes covering non-life catastrophe risks.
[2] "Peak" perils comprise the U.S. and U.S. territories and possessions, and Canada hurricane and earthquake.
[3] Source: Neuberger ILS team analysis as of October 1, 2025. Includes coupon-paying 144A notes covering non-life catastrophe risks.

In our view, models are more reliable for catastrophic peak perils than for other perils, which have historically received less research and development investment and have a shorter track record of development, having increased in frequency and severity more recently.

Certain perils such as wildfire present unique challenges. In our view, traditional backward-looking statistical methods are not well suited for non-stationary perils, where the risk is inherently sensitive to prevailing environmental conditions and can change rapidly. The Los Angeles wildfires highlighted this issue: Two wet winters in California drove dense vegetation growth, and a subsequent Southern California drought in fall 2024 created prime wildfire fuel.[4] Furthermore, although wildfire is a natural peril, it has significant human elements that add modeling complexities; for instance, during 2000 – 2017, humans caused nearly 85% of U.S. wildland fires.[5]

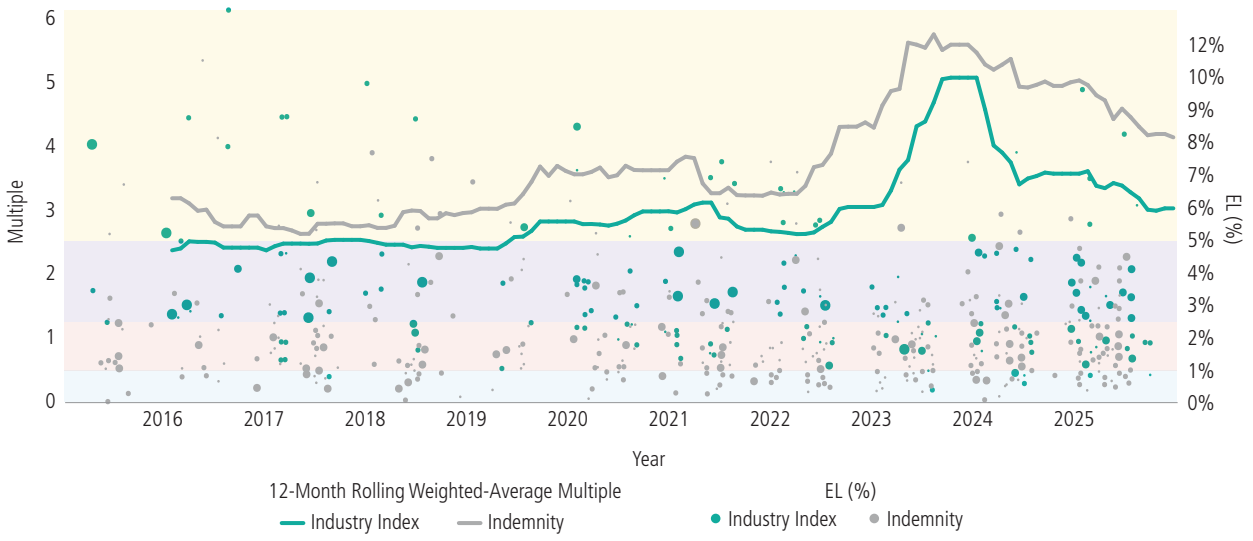
Other Considerations

Additional sources of modeling complexity, typically attributed to indemnity triggers, may extend beyond those discussed. They could arise from the methodology used by the cedant to project exposure data, completeness and accuracy of exposure data submissions to the modeling vendor, or how other reinsurance arrangements interact with the cat bond(s) when calculating the ultimate net loss attributable to the bond(s) after an event.

Implication for Risk-Adjusted Pricing

Due to the relatively limited sample size of industry index issuances, making meaningful pricing comparisons between trigger types is challenging. Nevertheless, Figure 1 shows that since 2015, there has been a higher 12-month rolling weighted-average multiple of spread over EL[6] for indemnity transactions, which could indicate stronger risk-adjusted returns; however, further examination is required to obtain a full picture.

FIGURE 1: VARIABILITY OF SPREAD OVER EL SINCE 2015 WITH POINTS SIZED BY ISSUANCE LIMIT



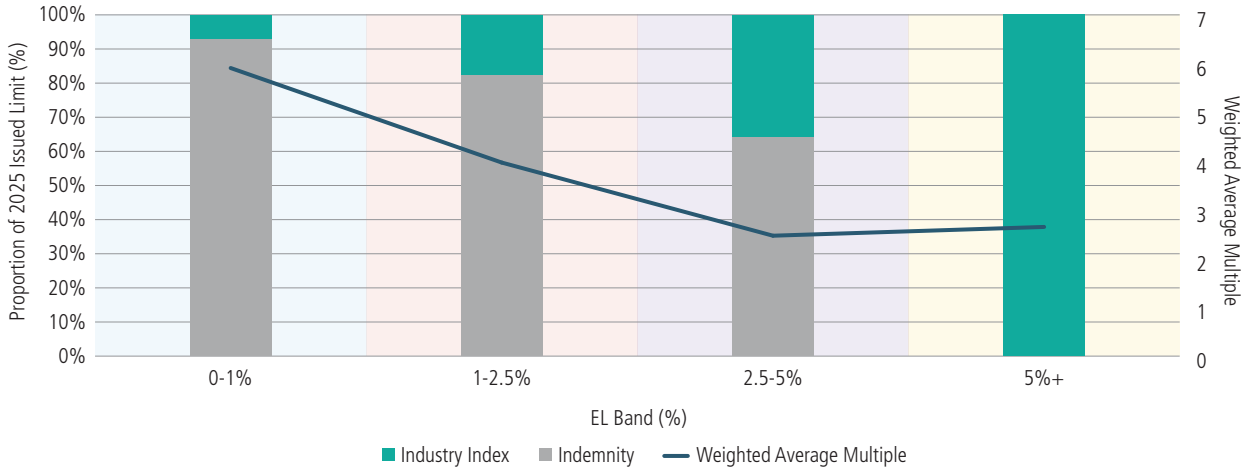
Source: Neuberger ILS analysis as of October 1, 2025. Multiple weighted by issuance limit. Includes coupon-paying 144A notes covering non-life catastrophe risks. For illustrative purposes only. Historical trends do not imply, forecast or guarantee future results. Due to a variety of factors, actual events or market behavior may differ significantly from any views expressed. **Past performance is not indicative of future results.**

[4] Source: NOAA Climate.gov. The weather and climate influences on the January 2025 fires around Los Angeles.
[5] Source: U.S. Forest Service Research Data Archive, 2000 – 2017 data based on Wildland Fire Management Information (WFMI).
[6] Source: Neuberger ILS analysis as of October 1, 2025. Multiple weighted by issuance limit. Includes coupon-paying 144A notes covering non-life catastrophe risks.

By using readily available market information, we can explain some key drivers of the observed disparity in weighted-average multiples:

- Minimum and maximum spreads accepted by the market amplify the impact on the multiple where indemnity and industry index transactions cluster at lower and higher EL bands, respectively.
  - Figure 2 shows the proportion of 2025 issued limit by trigger type across EL bands: The 0 – 1% EL band is dominated by indemnity (>90%), whereas all transactions in the 5%+ EL band are industry index. This confluence of EL band clustering by trigger type and spread lower/upper bounds aligns with the observed disparity in weighted-average multiple shown in Figure 1.
- Investors may also command a novelty premium from cedants, where they may be issuing inaugural cat bonds without an established track record. This multiple "benefit" is not applicable to cedant-agnostic industry index issuances, which are based on estimated industry-wide insured losses measured by an independent claim-reporting service.

FIGURE 2: TRIGGER TYPE BREAKDOWN OF 2025 ISSUED LIMIT BY EL BAND



Source: Neuberger ILS analysis as of October 1, 2025. Multiple weighted by issuance limit and covers both indemnity and industry index transactions. Includes coupon-paying 144A notes covering non-life catastrophe risks. For illustrative purposes only. **Historical issuance patterns do not imply or guarantee future results.**

Some ELs Are More Equal Than Others

Outside of what can be gleaned from market information, we have already argued that indemnity transactions have the capacity for more sources of modeling uncertainty than industry index, including idiosyncratic risk and a larger share of exposure to "other" peril regions. Accounting for these factors, the "true" EL would likely be significantly different, and most likely higher. Consider two distinct cat bonds, each with a 3% EL: One is a U.S. hurricane industry index transaction while the other is a multiperil (U.S. hurricane, U.S. severe convective storm and U.S. wildfire) indemnity transaction issued by a new cedant with high exposure concentrations. We would expect the modeled EL for the latter to be further from the "true" EL.

Of course, given the high severity and low frequency payout nature of the cat bond market, validation on historical impairments versus model expectations should be handled with care. It is perhaps noteworthy that industry index transactions issued since 2015 have had a higher weighted average EL at 3.6% versus 2.0% for indemnity, yet only 4.6% of industry index transactions have experienced impairment over that period, compared to 10.9% for indemnity transactions.[7] Put simply, it may appear that some bonds have equal ELs but, to borrow a theme from the great George Orwell, some are more equal than others.

Although it is tempting to make sweeping judgments on risk-adjusted pricing between trigger types, cat modeling involves considerable nuance, and attention to detail is needed.

[7] NB ILS analysis as of October 1, 2025, and EL weighted by issuance limit. Includes coupon-paying 144A notes covering non-life catastrophe risks and bonds in extension. Impairment percentage is based on count of impaired bonds over total bonds issued by trigger type.

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