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Best's
Methodology and Criteria

Catastrophe Analysis in AM Best Ratings

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Outline

- **A. Market Overview**
- **B. Enterprise Risk Management (ERM)**
- **C. Balance Sheet Strength**

The following criteria procedure should be read in conjunction with *Best's Credit Rating Methodology (BCRM)* and all other related BCRM-associated criteria procedures. The BCRM provides a comprehensive explanation of AM Best's rating process.

A. Market Overview

AM Best views catastrophic loss as a severe threat to the balance sheet strength of property and casualty insurers because of the potentially significant, rapid, and unexpected impact. No single exposure can affect policyholder and/or debt-holder security more quickly than catastrophes. The danger associated with catastrophes is amplified as, immediately following a significant event, a company remains exposed to further events, which can occur prior to the implementation of any risk mitigation strategies.

AM Best evaluates whether insurers accepting catastrophe risk can effectively manage this risk and have the financial wherewithal to absorb potential losses from their catastrophe exposure. The quality of an insurer's catastrophe stress testing program and exposure management influences the enterprise risk management (ERM) assessment, while the balance sheet strength assessment incorporates an evaluation of an insurer's financial capability in light of an event.

B. Enterprise Risk Management (ERM)

Catastrophe Risk Management

One of the components of AM Best's ERM framework evaluation is stress testing and non-modelled risks. In addition to this framework evaluation, AM Best also considers a company's approach to managing aggregate exposure of existing and new books of business across catastrophe prone regions. While there are common themes across all companies regarding prudent catastrophe risk management, companies practicing appropriate risk management are acutely aware of issues specific to their individual geographic exposures and perils. Companies with effective ERM use accurate and comprehensive data to properly manage those risks, while understanding and accounting for the limitations of their modeling tools and any other exposure monitoring techniques they may employ. AM Best reviews both the quality of the data an insurer uses for its stress testing and the tools it uses to monitor its exposure.

Catastrophe Modeling

Most insurers use sophisticated catastrophe modeling tools, provided primarily by specialized firms with extensive meteorological, seismological, statistical, and technological resources. These models

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depend on the veracity of the data input, which is subject to manipulation through the use of options that can raise or lower the net probable maximum loss (PML).

Catastrophe models are extraordinarily useful in the analytical and underwriting process, but they are only tools and cannot be solely relied upon for the management of maximum exposures. Careful monitoring of zonal and other specific aggregates, including what-if scenario testing using hypothetical severe events in areas with concentrated exposures or overlaying historical events on current portfolios, is crucial to understanding maximum potential loss and managing catastrophe risk.

A model's parameters are also critical to successful catastrophe risk management. Many model options can be set at varying levels of conservatism. Companies with prudent risk management practices include demand surge, storm surge, loss-adjustment expenses, and additional living expenses in loss estimates. Depending on what coverages they underwrite, they also take into account losses related to fire following earthquake, property structures and contents, business income, workers' compensation, ocean and inland marine, energy, flood, auto physical damage, and crops; and include an additional estimate for any unmodeled losses, such as assessments from guaranty funds, involuntary pools, etc. Additionally, they base model output on the event set that produces the most realistic loss estimates for their exposure. Companies that manage merely to lowest-case loss estimates, rather than to realistic loss scenarios, have an inherent weakness in ERM that is reflected in the evaluation.

The availability of several specialized tools for modeling catastrophes allows for a range of perspectives on a company's loss exposure. Determining which tool is used to assess catastrophe exposure requires an understanding of the differences of each modeling tool and of the risks unique to the insurer. Regardless of the number of models they use, companies that employ prudent risk management techniques are able to explain why the outputs selected are the most appropriate for capturing their catastrophe exposures.

Data Quality

Developing meaningful model output requires proper coding of loss exposure—key items are data quality, the accuracy of mapped locations, property coding, and the models used to assess property values. Once the location of the property is collected, property attributes need to be obtained. These include the structure of a building, the number of floors, the build year, the type of roof construction, and the surrounding buildings. AM Best strongly believes that an accurate measurement of loss exposure requires proper coding of all these key metrics. Since additional information improves loss estimates, properly capturing as many secondary modifiers as possible will enhance a company's ability to make more effective risk management decisions. Beyond aggregating additional data for input into modeling tools, companies can enhance their risk selection capability by analyzing the inputs independent of the tools to derive correlations between specific attributes and performance.

Regardless of the methods used or the approach taken, the data needs to be verified and as timely as possible to allow for a true valuation of the risks at hand. For primary carriers, regular inspection of exposures are especially necessary, because of potential changes to insured properties—for instance,

what was once a small restaurant might now have outdoor seating with significant upgrades in lighting, landscaping, and furniture. Without this updated information, the policyholder's rate may not accurately reflect the insurer's potential exposure.

Safeguards must be implemented to prevent an underwriter or an agent from manipulating the system by miscoding business for a more favorable classification. Audits of underwriting information to prevent errors and/or bulk coding are critical.

Aggregate Loss Exposure

Aggregate loss exposure can be used in scenario testing as a secondary test of catastrophe modeling tools. Better ERM practitioners establish specific, reasonable, and defensible zonal or other aggregate exposure limits, and consider potential unmodeled scenarios in addition to model output to ensure they are not overexposed to unforeseen events. An analyst may discuss with the company whether its limits are based on actual loss events or on the results of robust scenario testing.

Zonal aggregate limits are a useful tool in managing catastrophe exposure but have their weaknesses. One such limitation is that, at an aggregate level, individual risk underwriting is ignored—in other words, all risks are treated equally, regardless of risk profile. Insurers that more effectively manage their catastrophe risk use aggregate loss exposure analysis to enhance rather than replace modeled results.

Monitoring

The final key element of strong catastrophe risk management is the integration of exposure monitoring into the underwriting process. For those companies with material catastrophe exposure and effective ERM programs, exposure management is a continual process, not just an annual run of catastrophe models.

C. Balance Sheet Strength

Treatment in BCAR

Using company-provided modeled catastrophe loss estimates, AM Best includes a capital requirement for catastrophe risk in its Best's Capital Adequacy Ratio (BCAR) model. This information is collected through AM Best's Supplemental Rating Questionnaire (SRQ) or other similar requests on the items and parameters in the modeled output.

AM Best anticipates options for demand surge, storm surge, fire following earthquakes, secondary uncertainty, and the reference view/warm sea-surface temperature event set to be included in the loss estimates. The loss estimate should also include material sources of catastrophe risk—for example, property structure and contents, additional living expenses, business interruption, flood, auto/motor physical damage, workers' compensation, energy, ocean and inland marine, crop, recent building code changes and unmodeled losses such as loss adjustment expenses. These parameters enhance the standardization of the assumptions underlying the PMLs used in the BCAR model. If these items are

not included in the PML estimate, analysts may increase the expected loss estimate by a conservative margin, which will affect AM Best's view of the company's risk-adjusted capitalization in BCAR. AM Best analysts also review aggregate insured value data by territory and engage management in discussions about maximum exposure and risk appetite. If modeled data are unavailable, the aggregate zonal information is necessary to develop an appropriate stress test.

Natural Catastrophe Stress Test

In addition to including a capital requirement for potential catastrophe losses in its standard BCAR calculation, AM Best also conducts a catastrophe-related stress test on capitalization. The stressed BCAR results are intended to give insight into a company's balance sheet strength shortly after it experiences a catastrophic event. To reflect the assumption that the company's net exposure essentially remains the same after an event and that the organization remains exposed to further events, the net pre-tax PMLs used in the calculation of the standard BCAR remain in the stressed BCAR (with consideration for reinsurance program changes as described below).

BCAR Stress Test

The following calculations are completed in the BCAR model for the natural catastrophe stress test:

1. The reported surplus is reduced by the 1-in-100-year net post-tax PML (including reinstatement premium) from the per-occurrence all-perils combined information.
2. Reinsurance recoverables are increased a minimum of 40% of the difference in the 1-in-100-year gross (before all types of reinsurance) and net pre-tax per occurrence all-perils combined PML (excluding reinstatement premiums). This adjustment can also increase the reinsurance dependence factor. AM Best assumes the ratings on the reinsurers will remain unchanged as a result of the event.
3. An amount equal to 40% of the 1-in-100-year per-occurrence all-perils combined net pre-tax PML (excluding reinstatement premiums) is added to the loss reserves. This amount may be adjusted based on the reinsurance structure (i.e., caps, co-participation, etc.).
4. For those carriers that have changes to the reinsurance structure after the first event occurs, the net pre-tax PMLs (including reinstatement premiums) may be adjusted accordingly.

Note: The reduction to surplus in Step 1 is on a post-tax basis only if the analyst believes that the company will be able to use the tax benefit. Otherwise, the calculation is on a pre-tax basis.

Capital Adequacy Levels

A rating unit's stressed BCAR results are used to determine the final BCAR assessment, which is one component of the overall balance sheet strength assessment. **Exhibit C.1** details a reasonable guide to standard BCAR scores and their associated assessments.

Exhibit C.1: BCAR Assessments

VaR Confidence Level (%)	BCAR	BCAR Assessment
99.6	> 25 at 99.6	Strongest
99.6	> 10 at 99.6 & ≤ 25 at 99.6	Very Strong
99.5	> 0 at 99.5 & ≤ 10 at 99.6	Strong
99	> 0 at 99 & ≤ 0 at 99.5	Adequate
95	> 0 at 95 & ≤ 0 at 99	Weak
95	≤ 0 at 95	Very Weak

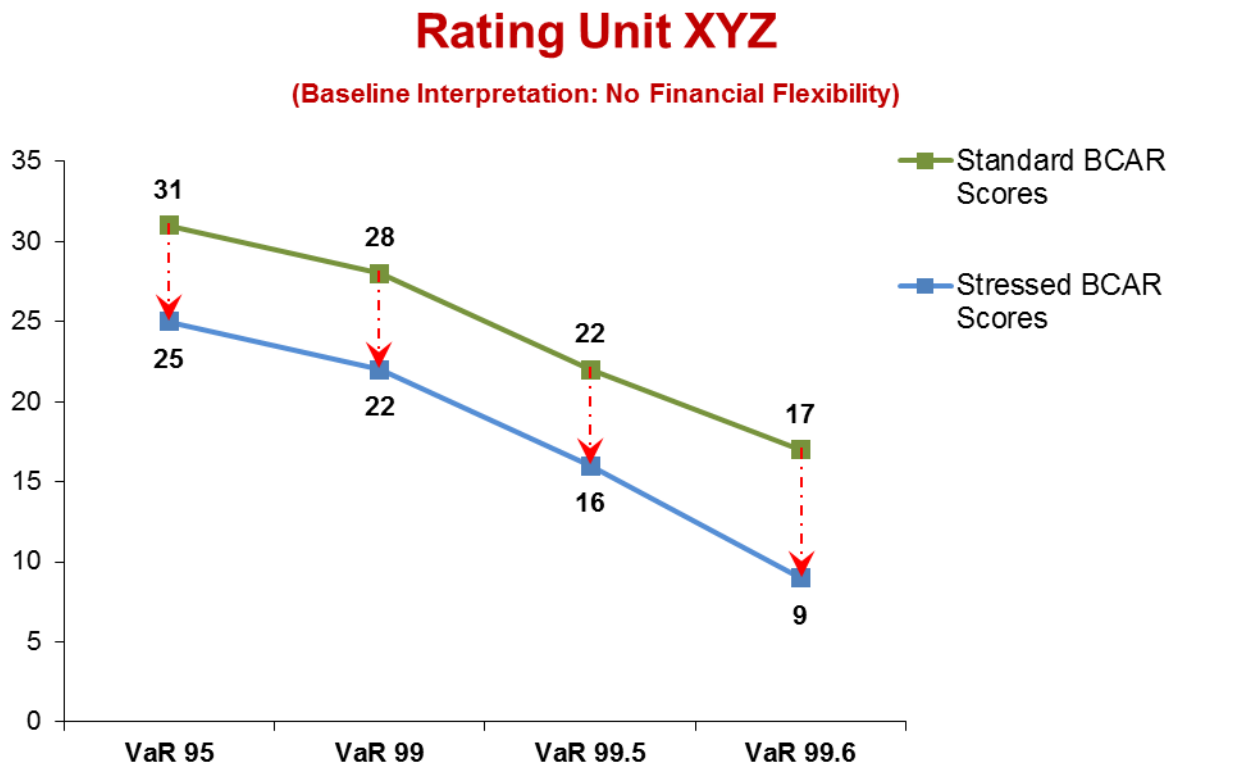
After calculating a rating unit's standard and stressed BCARs, AM Best compares the two. As a starting point, the interpretation of the stressed BCAR results will typically follow the path outlined in **Exhibit C.2**.

Exhibit C.2: Baseline Interpretation of BCAR Results

Standard BCAR Assessment	Stressed BCAR Tolerance (VaR Level)	Revised BCAR Assessment
Strongest > 25 at 99.6	> 10 at 99.6	**= Strongest**
Very Strong > 10 at 99.6 & ≤ 25 at 99.6	> 0 at 99.5	**= Very Strong**
Strong > 0 at 99.5 & ≤ 10 at 99.6	> 0 at 99	**= Strong**
Adequate > 0 at 99 & ≤ 0 at 99.5	> 0 at 95	**= Adequate**
Adequate > 0 at 99 & ≤ 0 at 99.5	≤ 0 at 95	**= Weak**
Weak > 0 at 95 & ≤ 0 at 99	≤ 0 at 95	**= Very Weak**

Exhibit C.3 shows the baseline interpretation for fictional rating unit XYZ. XYZ's BCAR score is 17 at the 99.6 VaR, resulting in a standard BCAR assessment of "Very Strong." The stressed BCAR scores are positive across all VaR levels, scoring 9 at the 99.6 VaR. While the stressed BCAR score drops to 9 at the 99.6 VaR, it remains within tolerance for a "Very Strong" assessment as it is greater than 0 at the 99.5 VaR. Thus, AM Best would not typically change the BCAR assessment. Had the stressed score fallen below 0 at the 99.5 VaR the revised BCAR assessment would likely have been lowered as XYZ would be outside of the stress tolerance guidelines. As noted, BCAR is just one of many factors considered in the balance sheet strength assessment, and XYZ's balance sheet strength assessment could differ from its BCAR assessment.

Exhibit C.3: Stressed BCAR Interpretation – Example



Exhibits C.2 and **C.3** illustrate only the baseline interpretation of stressed BCAR results. As discussed in the following section, AM Best may have greater tolerance for more significant drops between the standard BCAR and the stressed BCAR scores depending on the rating unit's financial flexibility.

The revised BCAR assessment of a rating unit that exceeds the stress tolerances in **Exhibits C.2** (baseline) and/or **C.4** (tolerances for those insurers with financial flexibility) will generally be lower than the standard assessment.

Financial Flexibility and Other Adjustments

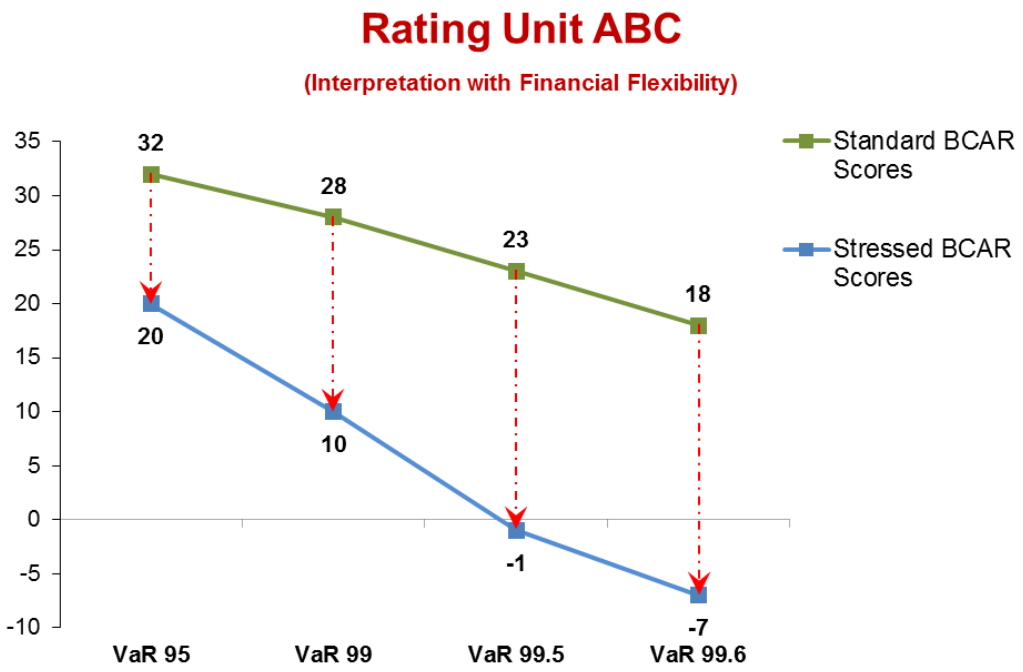
An organization's financial flexibility can affect the interpretation of the stress test. When reviewing the disparity between the standard BCAR and the stressed BCAR, AM Best may view companies that are able and willing to replace lost capital immediately following an event more positively and allow increased stressed BCAR tolerance (**Exhibit C.4**).

Exhibit C.4: Interpretation of BCAR Results for Rating Units with Financial Flexibility

Standard BCAR Assessment	Stressed BCAR Tolerance (VaR Level)	Revised BCAR Assessment
Strongest > 25 at 99.6	> 0 at 99.5	**= Strongest**
Very Strong > 10 at 99.6 & ≤ 25 at 99.6	> 0 at 99	**= Very Strong**
Strong > 0 at 99.5 & ≤ 10 at 99.6	> 0 at 95	**= Strong**
Adequate > 0 at 99 & ≤ 0 at 99.5	> 0 at 95	**= Adequate**
Adequate > 0 at 99 & ≤ 0 at 99.5	≤ 0 at 95	**= Weak**
Weak > 0 at 95 & ≤ 0 at 99	≤ 0 at 95	**= Very Weak**

The hypothetical scores of ABC in **Exhibit C.5** illustrate the effect of higher tolerance. ABC's standard BCAR assessment is again "Very Strong." However, its stressed BCAR assessment is -1 at VaR 99.5 and -7 at VaR 99.6. Since ABC has financial flexibility, AM Best may conclude that ABC's stress results are still appropriate for an overall BCAR assessment of "Very Strong" as its stressed BCAR remains greater than 0 at the VaR 99. Had ABC not benefitted from defensible financial flexibility, the BCAR assessment would have likely been lowered.

Exhibit C.5: Example of Interpretation with Financial Flexibility



The source and type of funds available plays an important part in determining whether a rating unit has financial flexibility. The capital markets' willingness to provide the necessary funding, which depends on market conditions, is also considered. The assessment of financial flexibility thus includes an examination of parent, subsidiary, affiliated relationships and incorporates AM Best's expectation of the level of commitment—both current and prospective—to the catastrophe-exposed entity.

The level of decline in the stress test assessment is viewed in the context of the historical volatility of both the balance sheet and operating performance. Companies with significantly volatile results will be viewed more cautiously in the stress test assessment, given that replenishing capital through earnings could prove difficult. Conversely, companies with consistently stable results, a favorable earnings history, and corresponding growth in surplus will be afforded greater qualitative credit in the stress test assessment.

Another important consideration is a company's exposure to multiple events in a season. This exposure to frequency applies to both regions exposed to hurricanes, severe convective storms and wildfires. Those with exposure to more frequent severe events will be viewed more cautiously in the stress test assessment. An accumulation of losses associated with multiple events is an important consideration, particularly with regard to net retention levels relative to surplus. A high frequency of events, combined with even modest net retention, could incur significant losses. Accordingly, the inability to absorb subsequent events could negatively affect the balance sheet strength assessment. AM Best considers the overall level of catastrophe exposure relative to surplus as part of the stress test assessment. In both the standard and stressed BCAR assessments, capital requirements for those

companies with a relatively high catastrophe exposure (either gross or net of reinsurance) are likely to be higher, given the inherent risks associated with an elevated dependence on reinsurance and greater exposure to credit risk.

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