



Tail Risk and the BCAR

Overview:

When an insurer/reinsurer has reinsurance transactions with a sidecar, an assessment must first be made to determine if there is a risk that the sidecar will have insufficient capital to support its reinsurance obligations to the sponsoring insurer/reinsurer. This risk, which directly impacts the sponsor of the sidecar, is called tail risk. Any tail risk from a sidecar transaction must be incorporated in the assessment of the sponsor's balance sheet strength. This report will outline how this tail risk is reflected in the sponsor's BCAR calculation.

A company's published BCAR is a baseline score that is calculated by reducing the sponsor's surplus by the greater of the per-occurrence net Probable Maximum Loss (PML) from a 1-in-100 year Hurricane loss or a 1-in-250 year Earthquake loss (or actual losses from a recent large event, if larger). This base case is sometimes referred to as "1st loss event". A stressed scenario is then performed by superimposing another event (i.e., "2nd loss event"). This is accomplished by further reducing the sponsor's surplus by the greater of the per-occurrence net PML from a 1-in-100 year Hurricane loss or 1-in-100 year Earthquake loss.

Illustration:

Exhibits C and D, on pages 2 and 3 respectively, show an example of how the tail risk is incorporated in the sponsor's BCAR calculation. This illustration uses the sample assumptions outlined in Exhibits A and B. Exhibit A (below) shows sample information for the sponsor such as surplus amount, gross PML, ceded PML (which in this case represents a 20% quota share), and net PML.

Exhibit A Example – Sponsor Information			
Surplus, end of year			\$600
PML (Occurrence exceedence probability):	Gross PML	Ceded PML (20% Quota Share)	Net PML
Base case (1 st loss event)	\$300	\$60	\$240
Stress case (2 nd loss event)	\$100	\$20	\$ 80

Sample information for the sidecar is shown in Exhibit B on page 2. It is assumed that the sidecar has a surplus balance of \$60 at the end of the year. Using the procedure outlined in A.M. Best's methodology report, *Assessing the "Tail Risk" of Sidecars* published on October 9, 2006, the calculated tail risk is \$10.



Exhibit B Example – Sidecar Information

Surplus, end of year			\$60
Calculation of tail risk:	Required Surplus (Collateral)	Actual Surplus (Collateral), End of Year	Tail Risk
	\$70	\$60	\$10

Exhibit C below illustrates the baseline BCAR model of the sponsor. Under the *Tail Risk Approach* (column A), the sponsor's surplus is first reduced by the \$10 tail risk (row 2). Then, the surplus is further reduced by the net per-occurrence PML of \$240 (row 6), which is the gross PML of \$300 (row 4) less the \$60 reinsurance benefit from the sidecar (row 5). The result is the sponsor's baseline adjusted surplus of \$350 (row 7). This is in contrast with the *Traditional BCAR* approach (column B) where no consideration was given to the \$10 tail risk, resulting in a baseline BCAR surplus of \$360 (row 7). A.M. Best will adopt the *Tail Risk Approach* for the published BCAR scores of the sponsors.

Exhibit C Sponsor's BCAR Model - Base Case (1st Loss Event)

		Tail Risk Approach Column A	Traditional BCAR Column B
1	Surplus, end of year	\$600	\$600
2	Less: Tail risk	- \$10	\$0
3	Surplus after tail risk adjustment	\$590	\$600
4	Gross PML	\$300	\$300
5	Less: 20% quota share reinsurance	- \$60	- \$60
6	Net PML	\$240	\$240
7	Adjusted surplus (Row 3 – Row 6)	\$350	\$360

Exhibit D (next page) illustrates how the tail risk is incorporated in the stressed BCAR calculation. Under the *Modified Tail Risk Approach* (column A), the sponsor's surplus is initially adjusted using the same adjustments from the baseline scenario, namely – the sponsor's surplus is first reduced by the \$10 tail risk (row 2), then the surplus is reduced by the 1st event net per-occurrence PML of \$240 in row 6 (which equals the gross PML of \$300 [row 4] less the \$60 reinsurance benefit from the sidecar [row 5]).

The sponsor's surplus is then further reduced by the 2nd event net per-occurrence PML of \$80 which is the gross PML of \$100 (row 7) less the \$20 reinsurance benefit from the sidecar (row 8). Note however, that the sidecar can no longer meet this \$20 reinsurance obligation for the 2nd loss event because its \$60 surplus was used up in the 1st event. Therefore, as shown in row 9, the \$20 reinsurance benefit is "charged back" to the 2nd event PML, offset by the \$10 tail risk that was previously subtracted from the surplus in row 2. The resulting adjusted 2nd event PML is \$90 (row 10). This exercise results in a stressed case BCAR surplus of \$260 (row 11).



Exhibit D Sponsor's BCAR Model – Stressed Case (1st and 2nd Loss Events)

		Modified Tail Risk Approach Column A	Tail Risk Reclassification Column B	Stressed BCAR Column C
1	Surplus, end of year	\$600		\$600
2	Less: Tail risk	- \$10	- \$10	\$0
3	Surplus after tail risk adjustment	\$590		\$600
4	Gross PML (1 st loss event)	\$300		\$300
5	Less: 20% quota share reinsurance	- \$60		- \$60
6	Net PML	\$240		\$240
7	Gross PML (2 nd loss event)	\$100		\$100
8	Less: 20% quota share reinsurance	- \$20		- \$20
9	Adjustment: Tail risk reclassification	+ \$10	+ \$10	+ \$20
10	Adjusted Net PML	\$90		\$100
11	Adjusted surplus (Row 3 – Row 6 – Row 10)	\$260		\$260

The above *Modified Tail Risk Approach* in Exhibit D is simplified in column C, *Stressed BCAR*. Under the *Stressed BCAR* approach, the sponsor's surplus is reduced by the 1st event net per-occurrence PML of \$240 (row 6), which is the gross PML of \$300 (row 4) less the \$60 reinsurance benefit from the sidecar (row 5). Note that the tail risk is not reflected. Surplus is then further reduced by the 2nd event net per-occurrence PML of \$80 which is the gross PML of \$100 (row 7) less the \$20 reinsurance benefit from the sidecar (row 8). As noted earlier, the sidecar can no longer meet this \$20 reinsurance obligation for the 2nd event because its \$60 surplus was used up in the 1st event. Therefore, a \$20 reinsurance credit "charge back" is added to the 2nd event PML (row 9). This reinsurance credit "charge back" essentially includes the \$10 tail risk. The resulting stressed case BCAR surplus is \$260 (row 11), which is the same as the surplus amount determined under the *Modified Tail Risk Approach* (Column A, row 11). The only difference between the two methods is the resultant value of the 2nd event net PML, which is more accurately reflected in the *Stressed BCAR* approach.

Column B of Exhibit D above serves as the mechanism by which the *Modified Tail Risk Approach* is converted to the *Stressed BCAR*. Also, note that if there were any tail risk remaining after the 2nd event, that remaining balance would show as a reduction to surplus in Row 2 of the *Stressed BCAR* calculation.

Mechanical Procedures:

In summary, A.M. Best will complete the BCAR calculation of the sponsor of a sidecar by using the (1) *Tail Risk Approach* in Exhibit C (column A) for the base case, and the (2) *Stressed BCAR* approach in Exhibit D (column C) for the stressed case. The specific mechanical steps to accomplish this are as follows:



Base Case

(as illustrated in Exhibit C, Column A, *Tail Risk Approach*)

1. Determine the amount of the sponsor's surplus;
2. Obtain from Structured Finance the following information applicable to the sidecar:
 - A. Amount of surplus, and
 - B. Tail risk;
3. Subtract the tail risk from the sponsor's surplus;
4. Reduce the surplus further by the gross PML (i.e., 1st event PML) less the applicable credit for the effect of quota share reinsurance from the sidecar;
5. The result is the Baseline BCAR adjusted surplus; and
6. Determine the indicated balance sheet strength for the applicable Baseline BCAR surplus.

Stressed Case

(as illustrated in Exhibit D, Column C, *Stressed BCAR Approach*)

1. Reduce the sponsor's surplus by the 1st event gross PML less the applicable credit for the effect of quota share reinsurance from the sidecar;
2. Reduce the surplus further by the 2nd event gross PML
 - A. less the applicable credit for the effect of quota share reinsurance from the sidecar,
 - B. if the sidecar's surplus is insufficient to meet its quota share reinsurance obligations in step 2.A., add a reinsurance credit "charge back." The reinsurance credit "charge back" is the amount of the reinsurance credit anticipated in step 2.A. less the amount of surplus remaining in the sidecar assuming the 1st event already occurred;
3. The result is the Stressed Case BCAR adjusted surplus; and
4. Evaluate the impact on the indicated balance sheet strength determined in the Baseline BCAR model.

Related Reading:

Assessing the "Tail Risk" of Sidecars (October 9, 2006), *Rating Sidecars* (June 28, 2006), *Catastrophe Risk Management Incorporated Within the Rating Analysis* (May 2006), *Catastrophe Analysis in A.M. Best Ratings* (April 2006), and *Understanding BCAR* (November 24, 2003).

For More Information Please Contact: Emmanuel Modu, Elmo Chin or Neal Enriquez of Structured Finance at 908-439-2200.

Thomas Mount, Actuary in the Property/Casualty Division.



In the Americas:
A.M. Best Company
Ambest Road,
Oldwick, NJ 08858
United States
Phone: (908) 439-2200, ext. 5742
Fax: (908) 439-3296
customer_service@ambest.com

In Europe, the Middle East and Africa:
A.M. Best Europe, Ltd.
6th Floor, 12 Arthur Street
London, England EC4R 9AB
United Kingdom
Phone: +44-020-7626-6264
Fax: +44-020-7626-6265
euro_enquiries@ambest.com

In Asia-Pacific:
A.M. Best Asia-Pacific Ltd.
Unit 5707, 57/F Central Plaza,
18 Harbour Road
Wanchai, Hong Kong
Phone: +852-2827-3400
Fax: +852-2824-1833
asia.ratings@ambest.com