

Assessing the “Tail Risk” of Sidecars

The tightening of reinsurance capacity in the property and casualty market has made the use of “sidecars” an attractive alternative to traditional retrocession. A sidecar is a limited-life, special-purpose reinsurance vehicle that generally provides property catastrophe quota-share reinsurance exclusively to its sponsor.

Of late, A.M. Best has seen an increase in the use of sidecars as a way to offer rated debt to investors seeking exposure to various layers of catastrophic risks.

Sponsors of sidecars generally take reinsurance credit for transferring risks to sidecars. While some sidecars may be capitalized to full aggregate limits, others may not be adequately capitalized to absorb losses that deviate from expectations. When capitalization is inadequate, some of the risk originally assumed to be fully hedged by a sidecar (in the determination of the Best’s Financial Strength Rating [Best’s FSR] of the sponsor) ultimately may be borne by the sponsor. This risk is referred to as “tail risk.”

This report was written by Emmanuel Modu, managing director of the structured finance group of A.M. Best Co. (emmanuel.modu@ambest.com)

A.M. Best already has announced (in its June 16, 2006 press release titled *A.M. Best States Position on Sidecars*) that it will publish Issuer Credit Ratings and/or debt ratings, where appropriate, on all sidecars and their corresponding debt. In addition, A.M. Best has published a Quick Reference on sidecars, *Rating Sidecars*, on June 28, 2006. *Assessing the “Tail Risk” of Sidecars* outlines A.M. Best’s procedures in estimating tail risk to ensure that the appropriate reinsurance credit is given to the sponsors of sidecars.

The Analytical Meaning of Tail Risk

Tail risk refers to the risk that will have to be borne by the sponsor of the sidecar if the sidecar is not sufficiently capitalized to support the quota share reinsurance. The appropriate question that must be asked in order to determine tail risk is as follows: What capital level is needed such that the probability of exhausting that capital level is within a given rating tolerance? A.M. Best does not apply the Best’s Capital Adequacy Ratio (BCAR) analysis in order to determine this capital level for certain special-purpose reinsurance vehicles and their obligations. Rather, it applies the methodology used in structured finance transactions

Exhibit 1

Best’s Cumulative Average Impairment Rates*

U.S. life/health and property/casualty data from 1977 to 2005.

Rating	1-Year	2-Year	3-Year	4-Year	5-Year	6-Year	7-Year	8-Year	9-Year	10-Year	11-Year	12-Year	13-Year	14-Year	15-Year
A++/A+	0.06%	0.20%	0.37%	0.55%	0.73%	0.97%	1.24%	1.52%	1.87%	2.23%	2.59%	3.00%	3.45%	3.90%	4.24%
A/A-	0.21	0.59	1.09	1.61	2.21	2.85	3.49	4.19	4.81	5.42	6.05	6.67	7.24	7.71	8.13
B++/B+	0.66	1.74	2.86	4.18	5.55	6.73	8.08	9.14	9.97	10.90	11.83	12.87	13.88	14.88	15.51
B/B-	1.98	4.06	6.03	7.94	9.96	12.13	13.97	15.76	17.58	19.33	21.10	22.79	24.38	25.71	26.98
C++/C+	3.39	5.66	8.48	11.20	13.51	15.77	17.89	20.73	23.03	24.78	26.21	27.16	28.05	29.41	30.26
C/C-	5.95	9.18	11.61	14.18	16.91	20.66	23.78	27.03	29.46	31.38	33.83	35.73	37.01	38.37	39.81
D	7.44	12.56	17.33	21.54	25.66	29.79	33.19	36.08	38.61	41.00	43.44	45.35	47.09	48.44	49.78
Secure	0.24	0.66	1.15	1.68	2.25	2.83	3.43	4.02	4.55	5.10	5.66	6.24	6.82	7.36	7.78
Vulnerable	3.63	6.45	9.18	11.78	14.38	17.14	19.51	21.89	24.03	25.96	27.92	29.56	31.05	32.39	33.63
All	0.71%	1.46%	2.25%	3.05%	3.90%	4.77%	5.62%	6.46%	7.22%	7.97%	8.74%	9.48%	10.20%	10.86%	11.41%

*Published in *Best’s Impairment Rate and Rating Transition Study – 1977 to 2005* (March 31, 2006). Updates available at www.ambest.com
Source: A.M. Best Co.



in which it sets specific capital levels for each Best's FSR derived from its insurance impairment studies, the latest of which is *Best's Impairment Rate and Rating Transition Study, 1977 to 2005*, published March 31, 2006. Exhibit 1, *Best's Cumulative Average Impairment Rates*, displays insurance company impairment rates by Best's FSRs published in the most recent impairment study. This study included more than 5,000 operating U.S. insurance companies with A.M. Best ratings from 1977 to 2005, and 650 incidents of impairments.

Based on the impairment studies (and specifically, the one-year impairment rates), A.M. Best has assumed an annual impairment rate for a range of Best's FSRs as shown in Exhibit 2, *Assumed One-Year Average Impairment Rates*. Absent any stress requirements, the data in this table can be interpreted as the annual probability of an insurance company with a given Best's FSR being impaired. An alternate interpretation, as described earlier, is that a reinsurance special-purpose vehicle that wants to achieve a specific rating (absent any other considerations) must hold enough capital such that the probability of impairing that capital is no higher than the percentage shown in Exhibit 2 for a given rating. The excess (if any) of the capital as dictated by the capital requirement in Exhibit 2 over the amount of capital held by the special-purpose reinsurance vehicle (absent any other considerations) is the tail risk of the sidecar. The specific procedures for calculating tail risk will be explained later in this document.

Information Requirements

A.M. Best's assessment of the tail risk of sidecars relies primarily on data and information from the three leading peril modelers (AIR Worldwide Corp.; EQECAT Inc.; and Risk Management Solutions Inc.) and the representatives of the sidecars. A.M. Best accepts modeled losses from the peril modelers that reflect the most conservative trends in peril

activities and reviews business origination and profitability data modeled by the sidecar's representatives. A list of some of the items reviewed, evaluated or monitored includes the following:

- **Risk Transfer** – Structural, regulatory, legal and all third-party related documents are reviewed by A.M. Best for evidence of true risk transfer to the sidecar.
- **Operational Risks** – The monitoring and record-keeping needed to maintain the legal separation of the sidecar from its sponsor and for properly allocating premiums and losses are important elements to A.M. Best.
- **Exceedance Curves** – A.M. Best will review the aggregate and occurrence exceedance curves for the company benefitting from the sidecar before and after the effect of the sidecar. A.M. Best also will request stressed aggregate exceedance curves (based on peril activity rates and total insured

A.M. Best Co.

Methodology

October 9, 2006

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For press inquiries or to contact the authors, please contact James Peavy at (908) 439-2200, ext. 5644.



The Insurance Information Source

Exhibit 2

Assumed One-Year Average Impairment Rates*

A++	A+	A	A-
0.03%	0.06%	0.21%	0.27%

Source: A.M. Best Co.

values as described later in this document).

- **Data Quality** – The level of data quality (especially granularity of data) is critical to the evaluation of the sidecar, because it could affect the level of stress on the aggregate exceedance curve.

- **Collateralization** – The level and form of the collateral, including investment guidelines, hedges on collateral value (if any), and the conditions surrounding the release of the collateral are critical to the determination of tail risk.

- **Degree of Peril Modeler Involvement** – A.M. Best has become aware that involvement of established peril modelers can range from simply making sure that the sidecar sponsors turn on the “right levers” (such as “storm surge,” “loss amplification,” and “fire following earthquake”) on licensed software to actually modeling the peril and verifying data quality. Obviously, A.M. Best will have more confidence in transactions that are independently modeled (with data verification) than those that are all modeled in-house with little or no input from third-party peril modelers. Transactions modeled in-house with the watchful eyes of independent reinsurance brokers who are experienced users of the various peril models are viewed positively by A.M. Best.

- **Terms and Conditions** – Covenants in the reinsurance or underwriting agreement between the sidecar and its sponsor will help determine whether the interests of the sidecar’s investors and sponsors are aligned.

- **Indemnifications and Carve-Outs** – The risks that are retained by the sponsoring company must be fully described.

- **Business Origination** – The projected business origination and how monitoring will take place in order to alert A.M. Best of deviation from plan.

- **Ongoing Risk Monitoring** – The mechanism by which ongoing risk monitoring will occur, thereby ensuring that A.M. Best can re-evaluate the tail risk of the sidecar periodically or as is warranted by catastrophic events.

- **Reserves** – The procedures for the establishment and liquidation (run-off) of reserves are important in order to ensure that adverse loss developments can be covered by the sidecar’s collateral, even when the sidecar’s “risk period” has ended.

- **Key Assumptions on Business Profitability** – Specific assumptions used in modeling premiums and loss ratios earned/experienced by

the sidecar, including assumed volatility of such premiums and loss ratios, are critical.

- **Profit Distribution** – Details on the circumstances under which profits can be withdrawn from the sidecar for distribution to investors (and the timing of such distributions) must be well defined.

- **Cash Flow Model** – Review of the cash flow model to understand the critical assumptions used in determining the profitability of the sidecar is an important element in the tail risk analysis.

- **Advisers** – Tax, regulatory, and legal advisers should be specified.

- **Reporting Requirements** – Quarterly financial statements, procedures for reporting material events and exposure information should be provided for ongoing monitoring.

Base Assumptions For Determining Tail Risk

In order to calculate the base level of tail risk, A.M. Best makes the following assumptions:

- **Business ceded to the sidecar is the same quality as the business normally written by the sidecar’s sponsor, and there are no unforeseen operational, legal, tax or regulatory risks to be borne by the sponsor.**

- **The data in Exhibit 2, *Assumed One-Year Average Impairment Rates*, will be used as the proxy for the annual default probability for a sidecar with a given Best’s FSR, despite the fact that impairment is a wider category of financial duress of an insurance company than an event of default on policyholder obligations (as is fully explained in the impairment studies). Specifically, for each Best’s FSR, the data in Exhibit 2 is assumed to represent the annual probability that the sidecar’s capital (debt, equity and any retained cash) will be exhausted.**

- **The base (unstressed) capitalization requirement for the sidecar will depend on the rating of its sponsor – the capitalization should be enough to make sure that the “shadow rating” for the sidecar (solely for the purpose of assessing tail risk) is the same as that of the sponsoring company. For example, if the sponsoring company has a Best’s FSR of “A,” then the sidecar must be sufficiently capitalized to merit an “A” rating and consequently will be assumed to have an annual default probability of 0.21% (as shown in Exhibit 2). If the sidecar’s sponsor has a rating of “B++” or**

lower, the “shadow rating” for the sidecar will be “A-.”

Procedures for Calculating Tail Risk

The initial calculation for tail risk should be done at the time of the evaluation of the credit risk of the sidecar and its debt (if any). In addition, the calculation should be performed at the following occasions: 1) annually after the latest tail risk assessment; 2) after any major catastrophic event; 3) after the true business portfolio has been fully formed (if the initial portfolio was based on a projection of business origination); and 4) whenever the Best’s FSR of the cedant is being reassessed.

The following are the steps necessary for calculating tail risk:

- **Step 1: Obtain the Aggregate Exceedance Curve** (including all perils and attritional losses, if any) for the business ceded to the sidecar (based on the “near-term” peril models by EQECAT or AIR Worldwide or based on the latest Risk Management Solutions peril model). Storm surge, loss amplification and “fire following earthquake” levers should be switched on for the models.

- **Step 2: Obtain the Shadow Rating** of the sidecar: the Best’s FSR of the cedant.

- **Step 3: Obtain the Annual Default Probability:** the impairment rate found in Exhibit 2 (*Assumed One-Year Average Impairment Rates*) that is associated with the sidecar’s Shadow Rating (Step 2). If the sidecar’s sponsor has a rating of “B++” or below, the Annual Default Probability will be 0.27%.

- **Step 4: Calculate the Confidence Interval** as follows: 100% less the Annual Default Probability from Step 3.

- **Step 5: Obtain the Required Collateral:** the loss associated with the Confidence Interval from Step 4. The data should be from the appropriate Confidence Interval on the Aggregate Exceedance Curve.

- **Step 6: Obtain the Initial Sidecar Collateral:** the initial debt and equity balance in the sidecar’s trust (net of fees).

- **Step 7: Obtain the Retained Cash:** the amount of cash from operations (net of operating expenses but before subtracting losses) that will be “trapped” in the sidecar. If for example, distribution of net income is allowed on a quarterly basis, A.M. Best will assume that Retained Cash will be no more than one-fourth of the year’s projected Retained Cash.

Step 8: Calculate the Total Collateral as follows: Initial Sidecar Collateral (Step 6) + Retained Cash (Step 7).

Step 9: Calculate the Tail Risk as follows: Maximum (0, Required Collateral [Step 5] – Total Collateral [Step 8]).

Stresses on Activity Rate, Insured Value and Retained Cash

The procedures above use the base aggregate exceedance probability curve to determine tail risk. However, A.M. Best will repeat those procedures using additional aggregate exceedance curves based on the following stress scenarios:

- Increased Peril Activity Rates – 5% increase, 10% increase, 15% increase.

- Increased Total Insured Value (TIV) – 5% increase, 10% increase, 15% increase.

- Combination of Increased Peril Activity Rate and TIV – 10% increase in peril activity rate and 10% increase in TIV.

If the sponsor of the sidecar and its representatives are unable to provide new aggregate exceedance curves based on the stress scenarios listed above, A.M. Best will stress the losses on the base aggregate exceedance curve at its discretion for each return period.

Another category of stress test is on the Retained Cash in Step 7 under the calculation procedures for tail risk. The Retained Cash will be reduced by up to 50%.

General Conditions Under Which The Stresses are Applied

The A.M. Best rating committee will have the flexibility to use the stressed exceedance curves to determine the appropriate level of tail risk. The considerations in using the stressed exceedance curves will include, but are not limited to, the following items:

- **Business and Reinsurance Type** – A.M. Best believes that the following risks related to lines of business, reinsurance types, and combinations thereof, can be difficult to model: terrorism, retrocession, marine/off-shore energy, excess and surplus lines, commercial, workers’ compensation and “non-peak” perils. The severity of the stress scenarios will depend partially on whether the business ceded to the sidecar derives a substantial amount of premium from these lines of businesses or reinsurance types.

- **Data Quality** – The quality of the data loaded into the peril model matters greatly to

A.M. Best. A.M. Best expects the extent to which the latitude and longitude of property locations are supplied to the peril model to be an indication of the level of data quality. Other indicators of data quality could be the extent to which the model has been supplied information related to construction type, roof type, occupancy type, contents information, square footage, etc. Excessive use of default values in the models for primary and secondary characteristics of property is a clear indication of poor data quality. The choice of the level of stress to impose on the parameters used in deriving the exceedance curve will depend on A.M. Best's view of the quality of data supplied to the peril model.

- **Certainty of Book of Business** – A.M. Best will apply higher stress factors to those sidecars whose sponsors have not finalized the book of business anticipated to be ceded to their sidecars at the time of the evaluation of the sidecars. If a sidecar's portfolio will be constructed on a "policy attaching" basis, A.M. Best will give consideration to the cedant's historical book of business and its business renewal history. Therefore, if the ceding company has a record of high renewal rates, A.M. Best would be more comfortable with the sidecar's business origination projection.

- **Deviation from Historical Book of Business** – A.M. Best expects that the sponsors of sidecars will not originate business outside of their areas

of expertise. Originations in completely new business lines will merit higher stresses unless the sponsors demonstrate that they have the staff and risk-management processes to properly price and monitor the risks.

- **Stresses Already Applied by the Sidecar Sponsor** – A.M. Best is aware that there are sidecar sponsors who are adept at modeling catastrophic risks and already make adjustments to data supplied to the peril models to produce more conservative results. The extent to which A.M. Best understands these adjustments may cause a reduction of the level of stress it will apply in the evaluation of tail risk.

Tail Risk and Best's FSR

Any tail risk determined by A.M. Best will reduce the amount of reinsurance credit claimed by the company sponsoring the sidecar. This, in turn, may have an effect on the sponsoring company's BCAR score – an important element in determining the Best's FSR of an insurance company. A.M. Best will review the exceedance curves associated with the sponsor before and after the effect of the sidecar in order to verify the amount of reinsurance credit taken by the sponsor. If the sponsor of the sidecar intends to remain "PML neutral," it will have to ensure that there is sufficient collateral in the sidecar relative to the quota share cession to eliminate any tail risk as determined by A.M. Best.



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A.M. Best Company

Ambest Road

Oldwick, New Jersey 08858

Phone: (908) 439-2200

Fax: (908) 439-3296

<http://www.ambest.com>

A.M. Best Europe Ltd.

12 Arthur Street, 6th Floor

London, UK EC4R 9AB

Phone: (44-20)-7626-6264

Fax: (44-20)-7626-6265

www.ambest.co.uk

A.M. Best Asia-Pacific Ltd.

Unit 5707 Central Plaza

18 Harbour Road

Wanchai, Hong Kong

Phone: (852)-2827-3400

Fax: (852)-2824-1833

www.ambest.com.hk