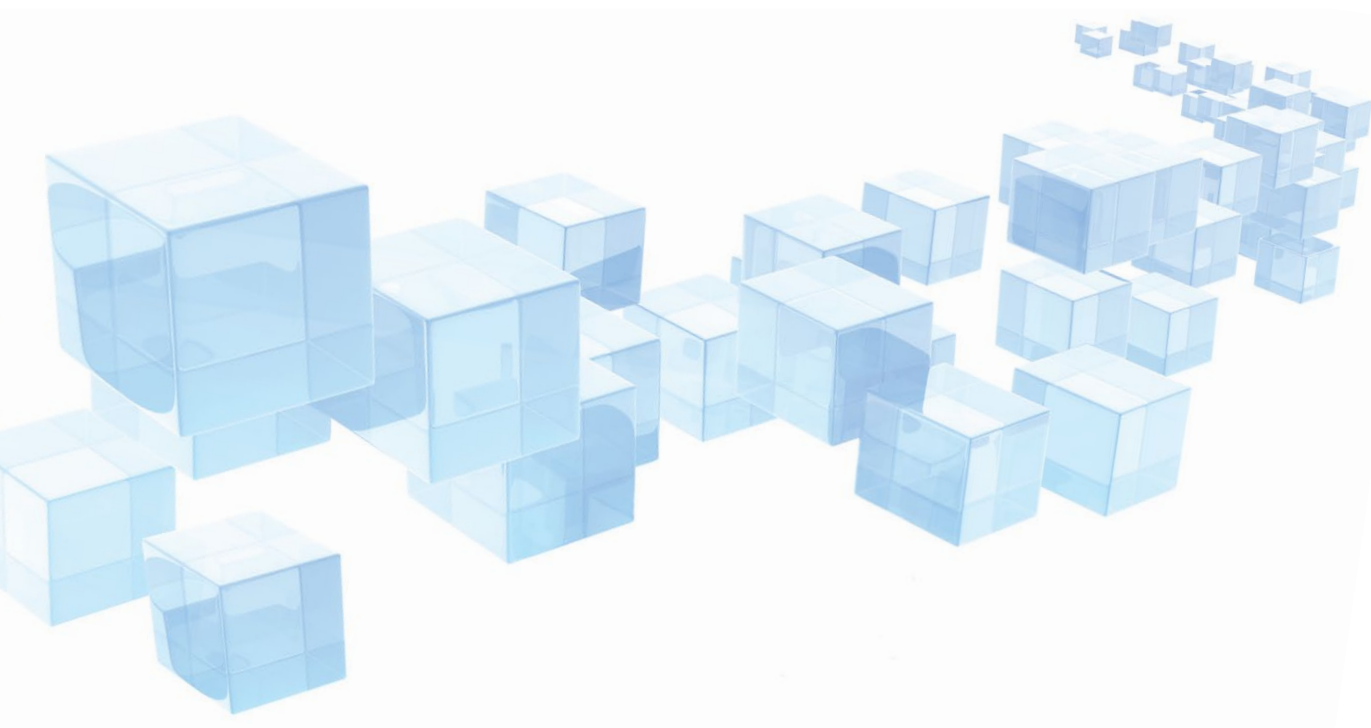


Best's Insurance-Linked Securities & Structures Methodology

August 16, 2016



Outline

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- B. Varieties of ILS Transactions
- C. Types of Ratings Assigned
- D. Information Reviewed for Rating Assignment
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A. Market Overview

This document outlines the methodology used by A.M. Best Rating Services, Inc. (A.M. Best) to rate insurance-linked securities and insurance-linked structures, collectively referred to as ILS transactions. ILS transactions are generally designed to transfer a well-defined insurance risk to third parties. While some of the exposures passed on to third-party investors are not new to the insurance industry, this mechanism for risk transfer is still being formulated and streamlined.

In some cases, ILS transactions are rated using structured finance technology by considering the credit profile or risk characteristics of the assets, liabilities, triggers, or legal structure that affect the payment of interest and principal to investors. These transactions are evaluated using this methodology, Best's Insurance-Linked Securities & Structures Methodology (BILSM). In other cases, ILS transactions that have the "look and feel" of insurance companies are rated based on a set of methods that may include structured finance technology. And while less emphasis may be placed on certain factors such as financial flexibility and/or business profile, these types of transactions are evaluated based on Best's Credit Rating Methodology (BCRM). The considerations as to whether to apply the BILSM or the BCRM to an ILS transaction include, but are not limited to, a combination of the following conditions:

- The existence of a special purpose vehicle (SPV) or a special purpose captive
- The extent of legal recourse to the sponsor
- The existence of a bankruptcy-remote entity that is unlikely to be consolidated
- The ability to reasonably predict the transaction's cash flows
- The ability to reasonably predict the amount of economic capital needed to meet counterparty obligations
- The de-linking of the transaction's cash flows from the sponsor
- A well-defined "waterfall" for distributing cash flows
- Well-defined investment guidelines for any collateral held for the benefit of sponsors or investors



- A stated transaction term
- Specified conditions under which the transaction can be terminated and obligations extinguished without triggering defaults
- The opportunistic nature of the transaction, which allows it to expand or contract based on market conditions or perceived market inefficiencies
- Limitations on the activities in which the managers of the transaction can engage

B. Varieties of ILS Transactions

ILS Convergence and Non-Convergence Transactions

A.M. Best puts ILS transactions into two categories:

1. ILS Convergence Transactions
2. ILS Non-Convergence Transactions

A.M. Best generally defines ILS convergence transactions as securities or structures sponsored by insurers/reinsurers that are designed to transfer risk and attract capital from the financial services industry, particularly the capital market. The deregulation of the financial markets, increased globalization, and better computer modeling techniques are changing the role of insurers and reinsurers from risk warehouses to financial intermediators by effectively moving insurance risks off their balance sheets by utilizing traditional reinsurance and/or capital market financial instruments. The most common ILS convergence transactions include the issuance of catastrophe bonds (the most common type of insurance-linked securities) and the establishment of reinsurance sidecars (the most common type of insurance-linked structures).

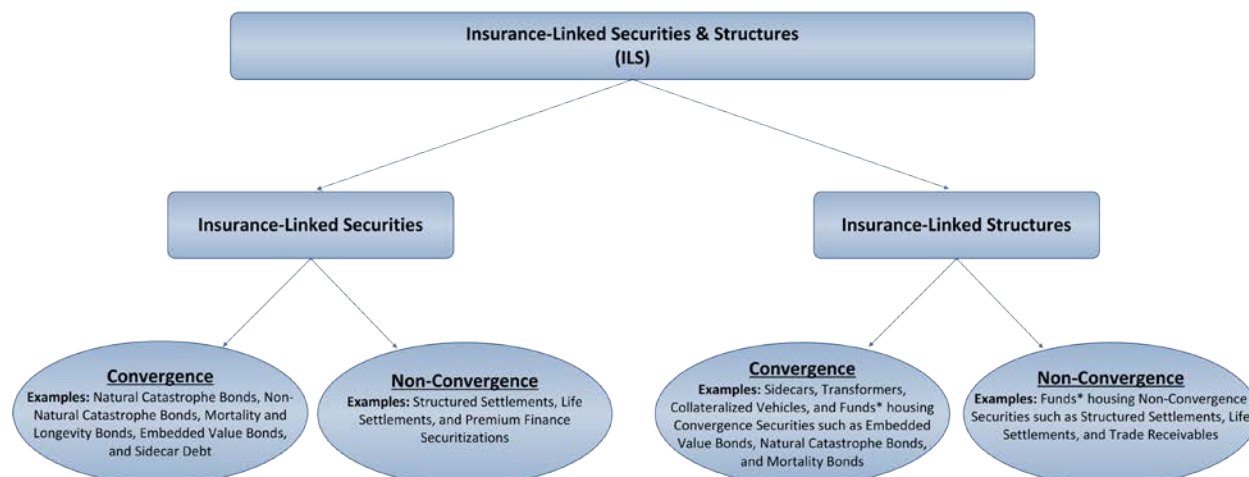
By contrast, ILS non-convergence transactions are generally defined by A.M. Best as securities or structures that are collateralized by insurance-related assets whereby the transactions are not sponsored by insurers or reinsurers and do not provide capital relief to the insurers or reinsurers. Examples of such transactions include the securitization of structured settlements and life settlements.

A.M. Best makes the distinction between ILS transactions because ILS convergence transactions can involve two types of risks that are borne by their sponsors—tail risk and basis risk. Tail risk is the risk that the sponsor of an ILS transaction will bear the risk of loss if the security/structure is not adequately capitalized to absorb losses within a prescribed confidence level. Basis risk on the other hand is the risk that the hedge or protection provided by an ILS convergence transaction is imperfect and thus leaves the sponsor exposed to the risk that their losses will not be fully covered for certain events. Tail risk and basis risk are not considered when rating ILS transactions but can affect the required capital calculations for insurance/reinsurance entities that utilize them to reduce their risk exposures.

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Exhibit B.1 shows the diagram of the various A.M. Best classifications of ILS transactions discussed so far in this document.

Exhibit B.1: Insurance-Linked Securities & Structures



*In practice, funds in the ILS space can house both convergence and non-convergence securities and products.

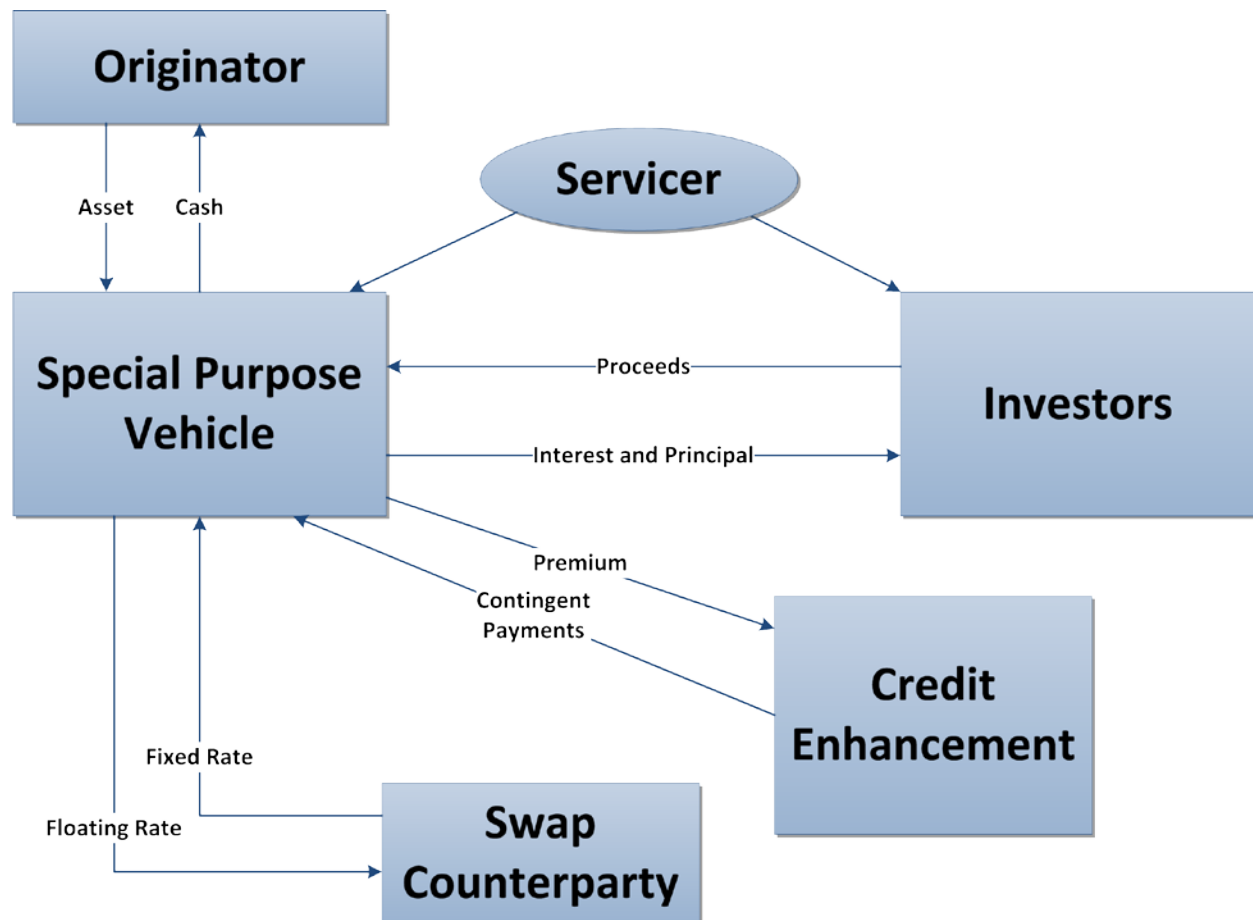
Generic ILS Transactions

ILS transactions contain similar features and structuring elements commonly found in asset-backed security transactions. The most common structures of ILS transactions can be generally grouped into four categories: asset-backed security, liability, value-in-force, and ILS fund.

Asset-Backed Security Structure

Asset-backed security transactions are collateralized by assets purchased with proceeds from the issuance of securities and for the most part de-linked from the originators of the assets. These assets produce periodic cash flows that are used to service the principal and interest payments of the issued securities, as well as the SPV's operating expenses. The securities are usually issued by a bankruptcy-remote SPV. The payment of principal and interest to investors depends on the performance of the assets and any other type of hedges employed in the transactions. The securities need not be tranching but there is usually an equity amount available to absorb some attritional losses before such losses impact the rated securities. This type of structure is typically used for transactions in which the performance of collateral can be reasonably modeled and there is a well-defined "waterfall" for the distribution of cash flows and the allocation of losses. The typical asset-backed security structure is shown in **Exhibit B.2**. The rating of securities issued by the special purpose vehicle can depend on the modeled default probability output.

Exhibit B.2: Generic Asset-Backed Security Structure



Liability Structure

Liability structures in the ILS space are generally transactions in which insurers or reinsurers attempt to access capital to help indirectly reduce their liability to policyholders. These transactions are typically structured so that payments to investors and the transaction sponsors are contingent upon remote events related to natural catastrophes, mortality, longevity, health claims, and other events that can be reasonably modeled.

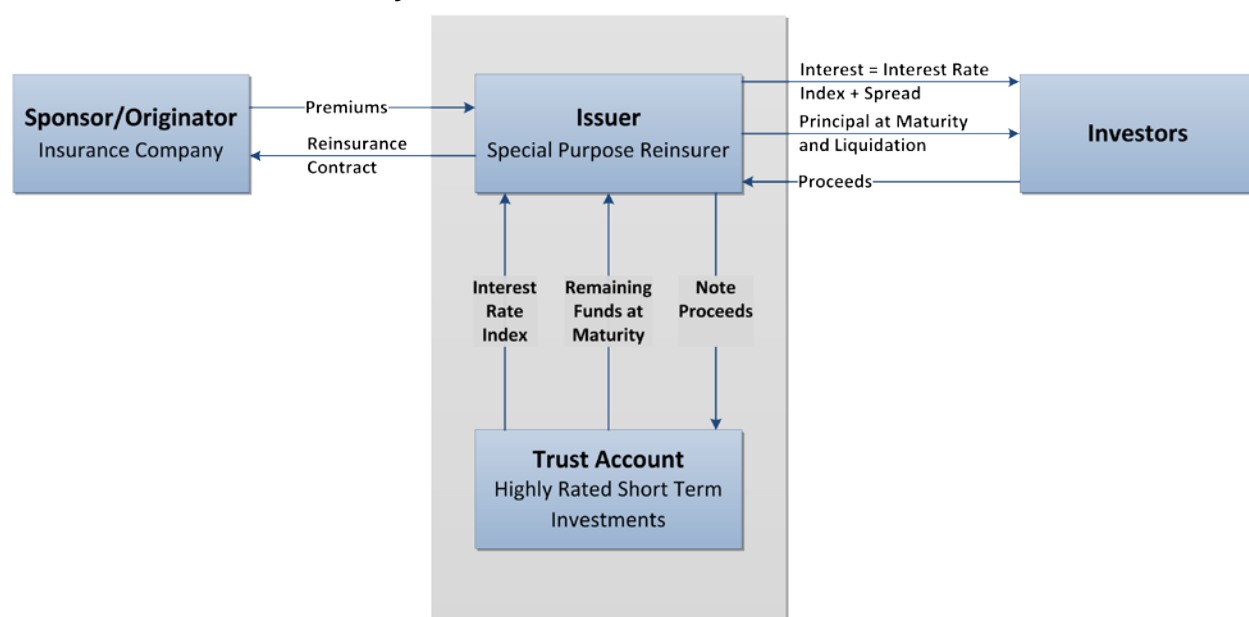
In general, the bonds associated with liability structures (such as catastrophe bonds) are issued by special purpose reinsurers, and the proceeds are deposited in a collateral account. The extent of the payment of principal to investors is contingent on the occurrence of events within a defined risk period. Investors receive full payment of principal at maturity from the collateral account if no covered events occur. On the other hand, if a covered event occurs, the sponsoring insurer or reinsurer receives payment from the collateral account for the protection it effectively purchased from the special purpose reinsurer to which it has paid premiums. The sponsoring insurer/reinsurer effectively buys a call option where the strike price is the event trigger and the maximum benefit to

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the insurer/reinsurer is the full limit of the purchased reinsurance. The typical liability structure is shown in **Exhibit B.3**. The rating of bonds with this liability structure is used partially depends on modeled attachment probabilities.

As mentioned earlier, liability structures are used to indirectly reduce the originator's liability to policyholders. With an asset-backed security, the originator can effectively sell all rights of a pool of assets to an SPV, thus achieving a true sale to an intermediary, which can securitize the assets. However, a liability originated by an insurance entity cannot be easily discharged for one simple reason: policyholders have entered into a contractual obligation with an insurance originator whereby they expect to receive contingent payments associated with the contract from that particular originator. If the insurance company transfers the contingent payment obligations to any other parties (such as a bankruptcy-remote vehicle or another insurer/reinsurer), the policyholders could face greater credit risk when the contingent payments are due. Therefore, insurance company originators cannot extinguish their liabilities to policyholders. For this very reason, ILS transactions with liability structures are not true securitizations even though they are commonly referred to as such by insurance industry analysts.

Exhibit B.3: Generic Liability Structure



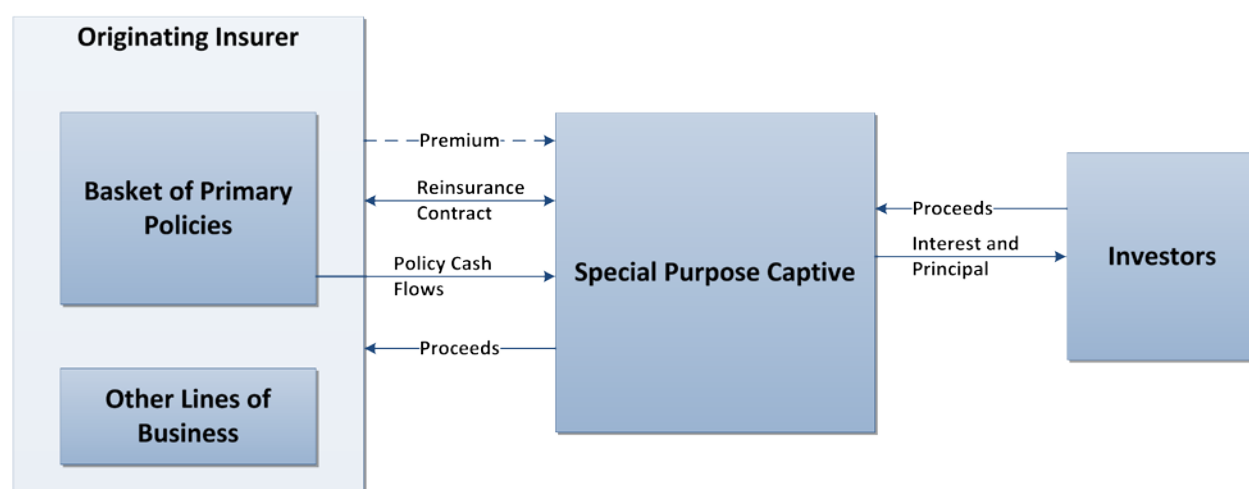
Value-In-Force Structure

A value-in-force ILS transaction structure monetizes the future value of the profit embedded in insurance policies. This monetization takes into consideration the underlying cash flows associated with the contractual obligations of insurers or reinsurers to policyholders. The value-in-force structure has been most often used for monetizing the economic value of blocks of insurance policies by considering the premiums, investment returns, reserves, mortality, persistency, and other

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factors. Some of the reasons for monetizing this economic value include the following: capital relief to the insurer or reinsurer, monetizing the future capital benefits of a run-off business, and redeploying capital to more profitable lines of business. The transaction generally involves the transfer of a block of business to a captive or special purpose entity. The typical value-in-force structure is shown in Exhibit B.4. The transfer normally includes all operating aspects of the business, including premiums, reserves, and (sometimes) the assets backing the insurance policies. Cash flow modeling, which includes actuarial assumptions, is performed in order to project future cash flows. Securities are sold to investors based upon these excess cash flow projections. Repayment to the investors is primarily based upon the future performance of the defined block of business. The rating of securities issued by value-in-force structures often depends on the modeled cash flow output based on deterministic scenarios and the size of the embedded value of the defined block of business. Because these transactions are monetized and not true securitizations as there is no true sale of assets to a separate vehicle, the credit risks taken by the investors are generally tied to the originating insurers.

Exhibit B.4: Generic Value-in-Force Structure



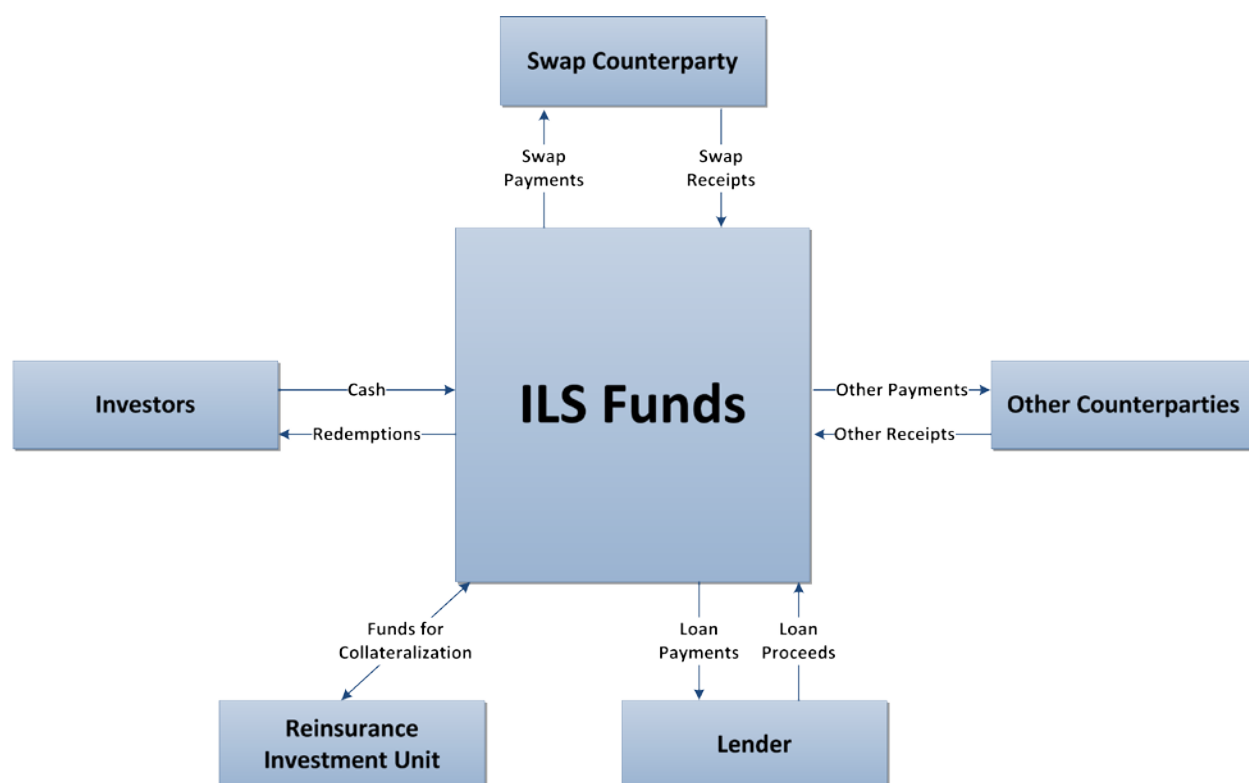
ILS Fund Structure

ILS Funds are investment vehicles that contain various insurance-linked assets and obligations such as: natural catastrophe bonds, collateralized reinsurance, industry loss warranties, extreme mortality bonds, surplus notes, trust-preferred securities, structured settlements (of both the period-certain and life-contingent varieties), ordinary annuities, life settlements, Regulation XXX/AXXX securities, collateralized debt obligations (CDOs) backed by insurance-related risks, and other insurance-linked assets, obligations, and structured securities. Historically, most ILS Funds have invested in natural catastrophe risk. However, more funds are diversifying to include mortality/longevity, health, mortgage, and other non-catastrophe property risks.

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As these funds expand and diversify their investments and investor base, ILS Fund counterparties may face a variety of credit exposures to the fund. These exposures could come in the form of derivative contracts, bank loans, and other types of debt. ILS Fund obligations to counterparties are satisfied with cash flow derived from fees, interest, asset liquidation, and other liquidity sources. A.M. Best's review focuses on the ability of the fund to meet its obligations.

Exhibit B.5: Generic ILS Fund Structure



C. Types of Ratings Assigned

The various ratings that can be assigned to ILS transactions include a Best's Issuer Credit Rating (ICR), a Best's Financial Strength Rating (FSR), or a Best's Issue Rating (IR).

Best's Issuer Credit Rating

An ICR is an independent opinion of an entity's ability to meet its ongoing financial obligations and can be issued on either a long- or short-term basis. A long-term ICR is an opinion of an entity's ability to meet its ongoing senior financial obligations, while a short-term ICR is an opinion of an entity's ability to meet its ongoing financial obligations with original maturities—generally less than one year. An ICR can be assigned to insurance operating holding companies, as well as to special purpose entities established for the issuance of a security or another financial purpose.

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Examples of ILS structures that can be assigned ICRs include: reinsurance transformer vehicles, sidecars, special purpose insurers, and ILS funds. However, an ICR will not be issued to a fully-funded entity that is set up solely for the purpose of issuing securities, has no operating personnel, and has a limited life span. An example of such a case is a special purpose reinsurance vehicle that issues a catastrophe bond.

Best's Financial Strength Rating

An FSR is an independent opinion of an insurer's financial strength and ability to meet its ongoing insurance policy and contractual obligations. In general, licensed insurers with full operating personnel (including managers, underwriters, claims adjusters, etc.) that are set up to be permanent in nature are assigned an FSR. An example of a licensed insurer that may not receive an FSR would be an insurance entity, such as a catastrophe bond's special purpose reinsurance vehicle, that is set up solely to issue debt securities, is short-term in nature, and has no real independent manager to make underwriting decisions.

Best's Issue Rating

Issues associated with ILS transactions are assigned an IR, which is an independent opinion of credit quality assigned to issues that gauges the ability to meet the terms of the obligation. An IR can be issued on a long- or short-term basis (obligations with original maturities generally less than one year). An IR assigned to a specific issue is an opinion of the ability to meet the ongoing financial obligations to security holders when due. Please note that an IR may be assigned to a security without assigning an ICR or an FSR to the issuer. An example of this is when a special purpose reinsurance vehicle issues a rated catastrophe bond. In this case, no FSR or ICR is assigned.

D. Information Reviewed for Rating Assignment

In this section, a list of typical information that A.M. Best expects to review when rating ILS transactions is cited. Since there are many varieties of such transactions, this list may not apply to all transactions; additional information may be required for transactions involving more esoteric insurance-related risks. The information required for rating ILS transactions includes the following, when applicable:

- An outline and diagram of the structure of the transaction
- Current draft of the prospectus, offering memorandum, trust indenture, term sheet, and related documents presented to potential investors
- Deal-related documents including reinsurance agreements, service agreements, administration agreements, counterparty agreements, and collateral agreements
- Definitions of trigger, amortization, and termination events associated with the transaction
- Procedures for reporting material events and exposure information affecting the transaction
- Summary of payment priorities or "waterfall"



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- Specified overcollateralization requirements, ratio tests, and triggers used to divert cash flows in the transaction
- True sale, non-consolidation, and enforceability opinions
- Legal opinions on the origination of assets in the collateral pool
- Legal/regulatory issues associated with the true sale of assets to the special purpose vehicle involved
- Detailed information regarding a transaction's stated collateral, such as collateral eligibility requirements
- Any data regarding underwriting associated with mortality related to the collateral pool in connection with mortality/longevity transactions
- Detailed information regarding the structural features of credit enhancements such as reserve accounts, excess spread, financial guarantees, insurance policies, and other mechanisms for enhancing the credit quality in a transaction
- Terms of any liquidity provisions or facilities
- Investment and/or reinvestment criteria
- Risk reports showing attachment probabilities, exhaustion probabilities, and expected losses associated with natural catastrophe and mortality events from third-party modelers
- Financial reports such as actuarial reports, financial risk position reports (mark-to-market on assets and derivative positions, if applicable), independent auditor's reports, and statutory financial statements
- Cash flow model, if available, and a description of any requirements to remodel the transaction after specific events
- Insurance carrier name, A.M. Best insurance carrier number, other NRSRO ratings on the collateral in a transaction if not rated by A.M. Best
- Default/recovery assumptions used in a quantitative model
- Plans for hedging any risks such as interest rate, mortality, and persistency risks
- Details of investments in ILS funds: risk classification, fair value, ratings (if any) associated with assets, issued or modeled attachment points or defaults, modeled loss distributions, history of fund asset liquidations compared to fair value and other information about the nature of the investments
- Details of any and all encumbrances associated with fund investments and any and all fund financial obligations
- ILS fund formation documents (including those associated with both feeder funds and master funds, if applicable), operating procedures, audits, historical return profiles, liquidation protocols, historical liquidity positions, profile of investors (by feeder funds if

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master-feeder fund structure), and other information necessary for a qualitative review of the fund's managers

E. Key Rating Drivers/Considerations

Quantitative Considerations/Assumptions

Credit Risk of Insurers and Insurance Obligations

The rating of ILS transactions often involves the credit risk of insurers and insurance obligations. The assumed default risk of issuers is displayed in Best's Idealized Issuer Default Matrix (**Exhibit E.1**) and the assumed default risk of issues (senior unsecured obligations) in Best's Idealized Issue Default Matrix (**Exhibit E.2**). Please see Appendix 1 for A.M. Best's definition of default and **Appendix 2** for a summary of how A.M. Best created the two idealized default matrices.

Best's Idealized Issuer Default Matrix

Exhibit E.1: *Best's Idealized Issuer Default Matrix* shows A.M. Best's default rates for issuers on Best's Long-Term Issuer Credit Rating (ICR) Scale as described in Understanding Best's Credit Ratings. This table is primarily used for transactions that require issuer ratings for modeling the aggregate credit risk of a portfolio of assets where the issuers' credit rating is known or available. Examples of such transactions may include securitizations related to annuities, reinsurance recoverables, cash value of insurance policies, unrated trust-preferred securities, unrated surplus notes, and other assets directly linked to the credit quality of insurance carriers.

Exhibit E.1: Best's Idealized Issuer Default Matrix

Year	aaa	aa+	aa	aa-	a+	a	a-	bbb+	bbb	bbb-	bb+	bb	bb-	b+	b	b-
1	0.08%	0.14%	0.20%	0.22%	0.28%	0.35%	0.45%	0.84%	1.23%	1.56%	3.73%	4.77%	10.33%	13.85%	19.53%	23.30%
2	0.11%	0.21%	0.30%	0.42%	0.62%	0.80%	1.00%	1.87%	2.97%	3.83%	7.30%	9.03%	15.53%	18.59%	24.28%	27.55%
3	0.14%	0.28%	0.41%	0.62%	0.96%	1.26%	1.56%	2.90%	4.68%	6.02%	10.80%	13.08%	20.41%	23.11%	28.87%	31.74%
4	0.18%	0.35%	0.52%	0.82%	1.30%	1.72%	2.11%	3.92%	6.34%	8.13%	14.23%	16.99%	25.05%	27.47%	33.32%	35.87%
5	0.23%	0.43%	0.64%	1.04%	1.65%	2.18%	2.67%	4.94%	7.98%	10.18%	17.60%	20.77%	29.50%	31.69%	37.65%	39.94%
6	0.29%	0.51%	0.76%	1.26%	2.00%	2.64%	3.23%	5.95%	9.57%	12.15%	20.90%	24.44%	33.79%	35.79%	41.85%	43.93%
7	0.35%	0.60%	0.89%	1.50%	2.36%	3.10%	3.79%	6.97%	11.14%	14.07%	24.15%	28.02%	37.91%	39.77%	45.93%	47.84%
8	0.42%	0.69%	1.02%	1.74%	2.72%	3.56%	4.35%	7.98%	12.67%	15.93%	27.35%	31.50%	41.90%	43.65%	49.89%	51.67%
9	0.50%	0.78%	1.16%	1.98%	3.08%	4.03%	4.91%	8.99%	14.18%	17.74%	30.49%	34.91%	45.75%	47.41%	53.73%	55.40%
10	0.58%	0.88%	1.31%	2.24%	3.45%	4.50%	5.48%	10.00%	15.65%	19.50%	33.58%	38.23%	49.46%	51.07%	57.44%	59.04%
11	0.67%	0.98%	1.46%	2.50%	3.82%	4.97%	6.05%	11.01%	17.10%	21.22%	36.62%	41.47%	53.05%	54.62%	61.03%	62.57%
12	0.75%	1.09%	1.62%	2.78%	4.20%	5.44%	6.62%	12.02%	18.52%	22.90%	39.60%	44.63%	56.52%	58.06%	64.49%	65.99%
13	0.85%	1.20%	1.79%	3.06%	4.58%	5.92%	7.19%	13.03%	19.91%	24.55%	42.53%	47.72%	59.86%	61.40%	67.81%	69.29%
14	0.94%	1.31%	1.96%	3.34%	4.96%	6.40%	7.76%	14.05%	21.28%	26.18%	45.40%	50.73%	63.08%	64.63%	71.00%	72.46%
15	1.04%	1.43%	2.14%	3.64%	5.35%	6.88%	8.33%	15.06%	22.63%	27.78%	48.23%	53.67%	66.18%	67.75%	74.05%	75.50%
	aaa	aa+	aa	aa-	a+	a	a-	bbb+	bbb	bbb-	bb+	bb	bb-	b+	b	b-

Best's Idealized Issue Default Matrix

Exhibit E.2: *Best's Idealized Issue Default Matrix* shows A.M. Best's assumed default rates for securities on Best's Long-Term Issue Rating (IR) Scale. This table is derived from *Best's Idealized Issuer Default Matrix*. *Best's Idealized Issue Default Matrix* can be used for securitizations that are collateralized by rated debt and other obligations. Examples may include securitizations of rated



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surplus notes, rated bank loans, and other rated assets. The table is also used for determining the ratings of certain securities such as those issued by sidecars, catastrophe reinsurance SPVs, and other securities in which the attachment or default probabilities have been determined over a specific time horizon. *Best's Idealized Issue Default Matrix* replaces *Best's Idealized Default Matrix* in various published criteria associated with insurance-linked securities and structures.

Exhibit E.2: Best's Idealized Issue Default Matrix

	aaa	aa+	aa	aa-	a+	a	a-	bbb+	bbb	bbb-	bb+	bb	bb-	b+	b	b-	ccc+	ccc	ccc-	cc	c
1	0.03%	0.08%	0.11%	0.14%	0.16%	0.20%	0.22%	0.28%	0.35%	0.45%	0.84%	1.23%	1.56%	3.28%	3.73%	4.77%	6.74%	10.33%	13.85%	19.53%	23.30%
2	0.07%	0.11%	0.13%	0.21%	0.24%	0.30%	0.42%	0.62%	0.80%	1.00%	1.87%	2.97%	3.83%	6.53%	7.30%	9.03%	12.42%	15.53%	18.59%	24.28%	27.55%
3	0.11%	0.14%	0.17%	0.28%	0.33%	0.41%	0.62%	0.96%	1.26%	1.56%	2.90%	4.68%	6.02%	9.73%	10.80%	13.08%	17.66%	20.41%	23.11%	28.87%	31.74%
4	0.15%	0.18%	0.22%	0.35%	0.42%	0.52%	0.82%	1.30%	1.72%	2.11%	3.92%	6.34%	8.13%	12.91%	14.23%	16.99%	22.60%	25.05%	27.47%	33.32%	35.87%
5	0.19%	0.23%	0.28%	0.43%	0.52%	0.64%	1.04%	1.65%	2.18%	2.67%	4.94%	7.98%	10.18%	16.04%	17.60%	20.77%	27.28%	29.50%	31.69%	37.65%	39.94%
6	0.24%	0.29%	0.34%	0.51%	0.62%	0.76%	1.26%	2.00%	2.64%	3.23%	5.95%	9.57%	12.15%	19.13%	20.90%	24.44%	31.75%	33.79%	35.79%	41.85%	43.93%
7	0.28%	0.35%	0.42%	0.60%	0.73%	0.89%	1.50%	2.36%	3.10%	3.79%	6.97%	11.14%	14.07%	22.19%	24.15%	28.02%	36.03%	37.91%	39.77%	45.93%	47.84%
8	0.33%	0.42%	0.50%	0.69%	0.84%	1.02%	1.74%	2.72%	3.56%	4.35%	7.98%	12.67%	15.93%	25.20%	27.35%	31.50%	40.13%	41.90%	43.65%	49.89%	51.67%
9	0.38%	0.50%	0.59%	0.78%	0.96%	1.16%	1.98%	3.08%	4.03%	4.91%	8.99%	14.18%	17.74%	28.18%	30.49%	34.91%	44.06%	45.75%	47.41%	53.73%	55.40%
10	0.42%	0.58%	0.69%	0.88%	1.09%	1.31%	2.24%	3.45%	4.50%	5.48%	10.00%	15.65%	19.50%	31.11%	33.58%	38.23%	47.84%	49.46%	51.07%	57.44%	59.04%
11	0.47%	0.67%	0.79%	0.98%	1.22%	1.46%	2.50%	3.82%	4.97%	6.05%	11.01%	17.10%	21.22%	34.01%	36.62%	41.47%	51.47%	53.05%	54.62%	61.03%	62.57%
12	0.52%	0.75%	0.90%	1.09%	1.36%	1.62%	2.78%	4.20%	5.44%	6.62%	12.02%	18.52%	22.90%	36.86%	39.60%	44.63%	54.95%	56.52%	58.06%	64.49%	65.99%
13	0.57%	0.85%	1.01%	1.20%	1.51%	1.79%	3.06%	4.58%	5.92%	7.19%	13.03%	19.91%	24.55%	39.67%	42.53%	47.72%	58.29%	59.86%	61.40%	67.81%	69.29%
14	0.62%	0.94%	1.13%	1.31%	1.66%	1.96%	3.34%	4.96%	6.40%	7.76%	14.05%	21.28%	26.18%	42.43%	45.40%	50.73%	61.50%	63.08%	64.63%	71.00%	72.46%
15	0.68%	1.04%	1.25%	1.43%	1.82%	2.14%	3.64%	5.35%	6.88%	8.33%	15.06%	22.63%	27.78%	45.16%	48.23%	53.67%	64.58%	66.18%	67.75%	74.05%	75.50%
	aaa	aa+	aa	aa-	a+	a	a-	bbb+	bbb	bbb-	bb+	bb	bb-	b+	b	b-	ccc+	ccc	ccc-	cc	c

Credit Risk of Issues/Issuers Not Rated By A.M. Best

If an issuer or issue is not rated by A.M. Best but is rated by another nationally recognized statistical rating organization (NRSRO), the rating issued by that NRSRO will be used in the transaction. A.M. Best will generally choose the rating of the NRSRO that rates the most issuers or issues in the related class or sub-class of credit ratings. A.M. Best considers the following classes of credit ratings in determining which NRSRO rating to use: financial institutions, insurance companies, corporate issuers, asset-backed securities, and government securities. Issuers without NRSRO ratings that have not previously defaulted on their obligations generally will be assigned a rating of “bb+”; those without NRSRO ratings that have defaulted in the past and are currently meeting their obligations will generally be assigned a rating of “b”. In such cases, an exception may be made when 1) the issuer has continually met its policyholder or contract obligations for the past three years, or 2) regulators have expressed confidence that obligations will be paid in full during the rehabilitation or runoff process. Similarly, for issues without NRSRO ratings, those that have not previously defaulted will generally be assigned a rating of “bb+”, while those that have defaulted in the past will generally be assigned a rating of “b”. It should be noted that issuers/issues with no ratings from any NRSROs will be defaulted in stress scenarios.

Collateral Adequacy

The adequacy of collateral is extremely important with liability structure transactions such as catastrophe bonds and sidecar debt because the use of collateral is one of the most common ways to minimize counterparty risks. Some common forms of collateral used in such transactions include: cash, government securities, agency mortgage-backed securities, corporate bonds, commercial paper, letters of credit guarantees, and stocks.



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A.M. Best refers to amounts determined to satisfy obligations associated with liability structures as the “liability amount”. Regardless of the form of collateral, A.M. Best expects the transaction’s collateral agreement to address issues related to maintaining certain agreed-upon levels of liquid collateral during the term of a transaction to meet the specified liability amount. Among the items that A. M. Best expects will be covered by collateral agreements designed to satisfy the liability amount are: the liability amount (which in most cases is the maximum liability amount or limit), eligible collateral, the existence of any hedge or swap agreements, permitted base currencies, collateral balance replenishment mechanisms, the timing of the delivery of the replenishment of collateral, the mechanism for determining the collateral’s market value, any assumed haircuts associated with the collateral, the frequency of the collateral’s market valuation, and other significant aspects of collateral management.

Advance Rate and Necessary Collateral

In certain situations when a transaction’s collateral agreement authorizes a narrow band of highly liquid and high quality assets (eligible assets), A.M. Best will group these in buckets (bucketed eligible assets) and determine the bucketed advance rates. These bucketed advance rates, when applied to a transaction’s liability amount, will yield the adjusted amount of collateral (necessary collateral) to be held for the benefit of policyholders or investors. The necessary collateral needs to be higher than the liability amount in order to address the market and credit risks associated with the collateral.

Determination of Advance Rates

To determine the bucketed advance rates for eligible assets in the investment guidelines associated with the collateral, A.M. Best calculates the distribution of credit and market losses associated with the bucketed eligible assets. This calculation uses the following parameters: yield volatility (in the bucketed eligible assets currency), specific credit quality of the bucketed eligible assets, duration of the bucketed eligible assets, specified frequency of collateral re-evaluations and adjustments, and other parameters.

Given the distribution of losses associated with any bucketed eligible asset, A.M. Best chooses the loss within a confidence interval commensurate with the average credit quality of the eligible assets in the collateral pool. For example, if the average credit quality of the eligible assets in the collateral pool is “aa”, the loss associated with this bucketed eligible asset will be chosen from the loss distribution such that the loss probability does not exceed 0.11% as shown on the 1-year default line of **Exhibit E.2: Best’s Idealized Issue Default Matrix** in the “aa” rating category. This amounts to losses at the 99.89% confidence level.

The loss at the chosen confidence level is subtracted from the original market value of the bucketed eligible asset to estimate its depressed market value in adverse market conditions. The bucketed advance rate is the ratio of depressed market value to original market value, calculated as follows:

$$\text{Bucketed Advance Rate} = (\text{Bucketed Eligible Asset Value} - \text{Losses at Applicable Confidence Level}) / \text{Bucketed Eligible Asset Value}$$



Determination of Necessary Collateral

The calculated bucketed advance rates are used for the duration of the transaction for any given liability amount unless the collateral investment guidelines change significantly or the eligible assets experience unusual credit or market circumstances. In each evaluation period when necessary collateral has to be determined, it should be calculated as follows:

$$\text{Necessary Collateral} = \text{Sum of (Liability Amount by Bucketed Eligible Asset / Bucketed Advance Rate)}$$

Liquidity

For some ILS transactions, liquidity is extremely important. This is especially true for transactions that involve catastrophe risk where losses can occur suddenly and precipitously. Such transactions often solve the liquidity problem by holding highly marketable securities. However, other transactions may rely on liquidating a variety of illiquid assets in extreme circumstances to meet cash calls and their financial obligations. For example, ILS funds that invest in various insurance-linked products may have difficulty meeting financial obligations in the event of substantial losses in highly correlated catastrophe exposures if they don't have enough cash or near-cash to meet short-term liquidity needs. A.M. Best expects any rated entity that may have to meet sudden cash calls due to the nature of their obligations to provide detailed information about:

- The precise nature of its obligations to third parties
- The categories of investments such as natural-catastrophe, mortality, longevity, mortgage, and other substantive categories held by the entity
- The obligation schedule associated with categories of investments held by the entity in various scenarios such as expected, moderately stressed, and extremely stressed scenarios (assuming run-off conditions)
- The liquidation hierarchy mapping out which assets are likely to be liquidated first
- The assets or investments that have no/limited secondary market
- The price volatility observed in the market for securities – particularly prices observed during recessions and catastrophe events
- The historical monthly net asset value of ILS funds
- The monthly projection (over a 1-year period) of cash inflow and outflow in various scenarios such as expected, moderately stressed, and extremely stressed scenarios (assuming run-off conditions)
- The mechanism, such as a cash reserve account or liquidity facility, to meet cash calls in various scenarios such as expected, moderately stressed, and extremely stressed scenarios
- Other considerations specific to the type of entity being evaluated

Treatment of Financial Guarantee or Other Credit Enhancement

Some ILS transactions involve financial guarantors, insurers, and other credit enhancers. Generally, if a financial guarantee provides insurance coverages for a security, A.M. Best will replace the credit quality of the security with the ICR of the financial guarantor unless the underlying credit quality of the security is higher than that of the financial guarantor. If the underlying credit quality of the security is higher than the financial guarantor's, the credit risk of the security will be the same as the credit risk of the underlying security before considering the effect of any financial guarantee. In some cases, A.M. Best will not determine the credit risk of an underlying security before it applies the rating of the financial guarantor to the security as long as the financial guarantee covers the immediate payment of all obligations to the noteholders in the event of any interruption of cash flows to such noteholders.

In some circumstances where an insurance policy (as opposed to a financial guarantee) covers a security, the credit of the insurer will be substituted for the credit of the underlying security if the transaction has enough cash to cover any ongoing obligations to noteholders before the claims filing process is completed and before the insurance payment is made to the insured security holder¹.

When A.M. Best models cash flows of a transaction that involves a financial guarantee, an insurance policy, or a hedge, the modeled cash flows will implicitly reflect joint probabilities of defaults of the guarantee and the securities in the collateral pool. For example, in a life-contingent annuity securitization, part of the cash flows may be guaranteed by a financial guarantor. The cash flow model will effectively apply the joint probability of default of the annuity provider and the financial guarantor to the cash flow associated with the annuities.

In all cases where credit enhancement is involved, A.M. Best expects the following, among others things: 1) the extent of the risk transfer to a third party will be clearly mapped out, 2) information about the claims settlement process is unambiguous, and 3) a legal opinion or memorandum discussing the legality and enforceability of the credit enhancement mechanism will be provided.

Loss Reserve Calculations

Rating ILS structures requires the determination of the reserves necessary to support losses that may emerge over time. This analysis may involve the following steps:

1. Assuming the ILS structure is in run-off, simulate the future losses associated with the book of liabilities to the end of the risk period;

¹ A.M. Best may or may not determine the credit risk of the underlying security before it applies the rating of the insurance company to the security, provided the insurance policy and the structure of the transaction satisfy the timely payment of all obligations to the noteholders in the event of any interruption of cash flows to such noteholders.

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2. For each scenario, determine the present value of future losses with an appropriate discount rate;
3. Arrange all the present values of future losses from highest to lowest;
4. Determine the appropriate loss reserve by choosing the losses within a confidence level commensurate with a target rating level for the structure.

Reliance on Independent Third Parties

A.M. Best places reliance on independent third-party experts including, but not limited to, modelers, actuaries, medical underwriters, and other experts in ILS transactions. Examples where reliance is placed on independent third parties include: the assessment of natural catastrophe risks, determining embedded value in insurance policy and annuity products, performing loss reserve analysis, determining mortality and persistency rates, and other instances requiring in-depth insurance and analytical acumen. When the sponsor or issuer of a transaction includes an independent third-party expert in the rating process, A.M. Best expects a written report about the scope, approach, and analysis related to the quantitative evaluations provided by such experts.

Qualitative Considerations/Assumptions

Qualitative considerations and assumptions depend on the type of ILS transaction, but some of the generic issues that apply to broad categories of transactions are as follows:

Structural Risk: The risk that a flaw in the transaction's structure has put the interest of investors at risk. Some of the most significant documents that A.M. Best will review (sometimes with input from independent third parties) to understand the structural risks embedded in the transaction include:

- *Legal Documents*—Review of the legal and enforceability opinions, including non-consolidation opinions, true sale opinions, loan and security enforceability opinions, and other legal opinions regarding insurance and other matters related to the transfer of assets to the entity involved with the transaction.
- *Transaction Documents*—Review of transaction documents, including loan and security agreements, indentures, liquidity facility agreements, servicing agreements, and participation purchase and sale agreements.
- *Hedge Documents*—Review of any hedging documents or agreements that provide support to the transaction.
- *Insurance/Reinsurance Agreements*—Review of any financial guarantee or insurance policy supporting the transaction with a view towards gauging the possibility of disputes that might arise due to ambiguities in contractual language.
- *Risk Analysis Reports*—Review of any risk analysis reports provided by third parties regarding any evaluations of the risks associated with a transaction.

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Multiple Event Triggers: The existence of multiple event triggers (for example, second or third event triggers) for liability structures such as catastrophe bonds, sidecars, and others. Existence of such triggers could ameliorate the effect of low-frequency, high-severity catastrophe events.

Risk Period: The risk period of the coverage, the annual re-setting of attachment points to address changes in the covered portfolio (such as changes in demographics and exposure), extension options, and the model archiving policy factors associated with liability structures.

Origination Risk: The risk that the originators of the collateral in an asset-backed security structure have engaged in questionable activities in fulfilling their duties such that it puts the validity of the assets in question.

Rating of Ceding Insurer/Reinsurer: In some cases, the rating of an ILS structure may be capped by the rating of the insurer/reinsurer that has ceded business to the structure.

Risk of Adverse Selection: The risk that the collateral or risks selected for the transaction have been chosen in such a way as to put the investors at a disadvantage due to asymmetry of information between the issuers and investors.

Moral Hazard: The risk that an entity engages in riskier business activities than normal simply because another entity is bearing the cost of such risks in part or in whole.

Quality of Service Providers: Service providers (such as modelers, underwriters, collateral managers, etc.) are extremely significant to the success of some ILS transactions.

Existence of Back-Up Servicers: Some ILS transactions may be at risk if primary service providers withdraw or are removed from the transaction for non-performance.

Operational Risk: Some ILS transactions that hinge on the efficient and timely performance of various parties may be at risk if any of the parties in the chain are negligent.

Redemption Risk: If the entity is an ILS fund, the type of investors in the fund may determine whether there is likely to be excessive redemptions in economic downturns.

Asset Turnover: If the entity is an ILS fund, the frequency of the asset turnover segregated by categories of assets can result in more frequent monitoring of the fund's investments.

F. Risk Modeling

The Use of Modeling Results

In general, data and information necessary for analyzing risks associated with certain ILS transactions are the same as those used by insurers/reinsurers in the pricing of the risks for which they provide coverage. In some cases, A.M. Best may have the information it needs to evaluate such risks and determine how they ultimately affect the likelihood of investors to receive timely payment

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of interest and principal. For example, insurer default assumptions used in trust-preferred CDOs are based on data produced by A.M. Best through its studies of defaults.

However, with most ILS transactions, A.M. Best relies on the sponsor to provide the data and modeling results associated with the risk if indeed the risk can be priced. This information and models are usually sourced from third parties such as professional peril modelers, actuarial firms, brokers, or a sponsor's own internal risk assessment and modeling.

Modeling results are typically derived from the following several distinct sources:

- Output from models built by A.M. Best using issuer and issue default data, as well as other available data such as published mortality tables or loss data provided by transaction sponsors.
- Output generated by risk modeling agencies using models recognized by the insurance industry as reliable. Such models may include those provided by various peril modelers, actuarial consultants, and insurance brokers.

Results from models built by transaction sponsors (especially insurers and reinsurers) are qualified to gauge such risks as natural catastrophe, longevity, mortality, cyber, terrorism, operational, aviation, energy, and other risks covered by such sponsors in their normal course of business.

In instances where A.M. Best develops its own model to provide this information, the outputs of the models are usually: default probabilities associated with the securities being rated or loss exceedance curves that show the loss distributions of the risks being measured.

A.M. Best will accept the output from models of recognized risk modeling agencies and actuarial organizations that have gained industry-wide acceptance. When the model is provided by the sponsor or its representative, A.M. Best expects the model to capture all significant risks in a systematic and comprehensive way. A.M. Best will review any model documentation; evaluate the reasonableness of the model assumptions and results; and, in certain cases, identify additional stresses on key model inputs and parameters. In some cases, A.M. Best may engage third parties to assist in the understanding of elements of the model and formulating relevant questions about modeling methodologies and parameters.

A.M. Best considers several factors when determining whether it will rate transactions that rely on models created by transaction sponsors as opposed to third parties: 1) the definition of the exposures or perils, 2) the amount of event catalogues associated with the exposure or perils, 3) whether a third party has evaluated the model, 4) the extent to which the modeling has included historical extreme events, and 5) A.M. Best's comfort level with the model after discussions with the sponsor.

Specific Modeling Procedures

For models that produce default probabilities or attachment points associated with rated securities, A.M. Best focuses solely on the probability of the first dollar of loss as opposed to expected loss. Given the expected maturity of the security in question, the default threshold for each rating category is shown in *Best's Idealized Issue Default Matrix* (**Exhibit E.2**).

A.M. Best's Stochastic Modeling

In some cases, A.M. Best will perform Monte Carlo simulation based on default rates, mortality rates, and other parameters associated with the collateral to produce a default rate on rated securities. In general, a uniform random number between 0 and 1 is drawn. That random number is compared to each cell of a yearly cumulative default vector associated with a given credit rating, which can be found in **Exhibit E.1** or **Exhibit E.2**, depending on whether the simulation process is being done based on issuer or issue credits. The year in which the random number exceeds the cumulative default cell is considered the year in which the asset defaults. Once a default occurs, a recovery rate is assumed based on the type of asset. For a security that involves surplus notes, for example, the recovery rate is assumed to be 0%. For a collateral pool such as an insurance policy, the recovery rate can be as high as 80%. This process is followed thousands of times for all the credit-related assets in the collateral pool. The annual cash flows associated with this pool are accumulated and distributed according to the transaction's waterfall, which describes the priority of payments as defined in the transaction's documents. If there is not enough cash flow to meet the interest or principal payments to a rated security held by an investor in the transaction, a default is recorded.

The default probability of the rated security is tabulated as the ratio of the number of times the security defaults to the number of total simulations conducted in the Monte Carlo simulation process. To determine the rating that would be assigned to the security (before any qualitative considerations or stress scenarios), the security's default probability will be matched with the approximate expected maturity of the security to yield a rating for the security as dictated by *Best's Idealized Issue Default Matrix* (**Exhibit E.2**). For example, assume that the default probability tabulated for an asset-backed security with expected maturity of five years is about 2.50%. One can find the approximate rating of the security based on *Best's Idealized Issue Default Matrix* (**Exhibit E.2**) by finding the rating that is closest to the intersection of the 5-year line and 2.50%. That rating is closest to a "bbb-" issue rating, which is shown as having a 5-year cumulative default probability of 2.67%. There are asset-backed security transactions and some insurance risks such as natural catastrophe-related securities for which A.M. Best would rely on the sponsor and its advisors to produce default probabilities associated with the securities. Our process for determining the ratings for those transactions also begins with first determining the rating based on the term structure and the default probability of the obligations.

Deterministic Modeling

The modeling performed on the various ILS transactions depends entirely on the type of structure. As discussed earlier, Monte Carlo simulation is performed by A.M. Best or by the sponsors of the transaction for some asset-backed security structures and insurance risks. However, for some transactions that involve whole blocks of insurance business and voluminous granular insurance risks, stochastic methods give way to deterministic analyses where stresses are applied to the most sensitive parameters associated with the transaction. This is used to gauge the effect of: depressed investment returns, mortalities associated with epidemics, adverse lapse and persistency rates, extreme natural catastrophic events, and other parameters related to the ILS transactions in question where stochastic methods are not possible given computational constraints. The effect of these scenarios on the transaction's cash flows is then tied to ratings that may be constrained by the ratings of the entity that originated the risks.

G. Assignment of a Rating

A.M. Best's analytical process incorporates a host of quantitative and qualitative measures that evaluate sources of risk for ILS transactions. In some cases, the default probability, attachment probability, and losses within a certain confidence level are substantive considerations in the rating of ILS transactions. However, these quantitative measures are sometimes sublimated to other qualitative considerations that include: operational, origination, structural, counterparty, legal, and other qualitative risks that can affect the performance of the ILS transaction. All credit ratings are initially determined and subsequently updated by a rating committee, which considers these quantitative and qualitative factors in its review and deliberation process toward a rating action.

H. Surveillance/Monitoring Activities

Once a rating committee has assigned a rating, A.M. Best monitors and updates that rating by regularly analyzing the issue or issuer's creditworthiness. A.M. Best analysts continually monitor current specific developments associated with the transactions. While it is not possible to present an exhaustive list of surveillance and monitoring activities for all ILS transactions, typical A.M. Best surveillance includes:

- Review of the quarterly financial statements to assess actual to forecasted operating performance
- Review of the underlying risk portfolio of the entity being rated; this may include any credit risk developments in the portfolio or any new loss exceedance curves
- Review of financial reports such as actuarial reports, financial risk position reports (mark-to-market on assets and derivative positions, if applicable), independent auditor's reports, and statutory financial statements
- Monitor the changes to an entity's claims-paying ability



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- Monitor of investment risks associated with a rated entity's collateral
- Review any reports issued by a trustee, a servicer, or third-party and in-house peril modelers
- Monitor the credit quality of counterparties—including financial guarantors, insurers, liquidity providers, and other credit enhancers
- For life-contingent transactions, monitor the mortality in the transaction

Appendix 1

A.M. Best's Definition of Default

A.M. Best generally defines a default when either of the following conditions apply: 1) an obligor failed to timely pay principal or interest due according to the terms of an obligation or the issuer of the security or money market instrument failed to timely pay principal or interest due according to the terms of the security or money market instrument; or 2) an obligor has been designated as a financially impaired company (FIC).

A.M. Best designates an insurer as an FIC as of the first public action taken by an insurance department or regulatory body, whereby the insurer's: a) ability to conduct normal insurance operations is adversely affected; b) capital and surplus have been deemed inadequate to meet regulatory requirements; or c) general financial condition has triggered regulatory concern. The actions include supervision, rehabilitation, liquidation, receivership, conservatorship, cease-and-desist orders, suspension, license revocation, and certain administrative orders. Companies that enter voluntary dissolution and are not under financial duress at that time are not counted as financially impaired.

Please note that financial impairment of insurance companies often occurs even if an insurance company has not formally been declared insolvent. For instance, an FIC's capital and surplus could have been deemed inadequate to meet risk-based capital requirements, or there might have been regulatory concern regarding its general financial condition. Thus, at any given rating level, more insurers would be impaired, according to A.M. Best's definition, than actually would default on insurance policy and contract obligations. Nevertheless, A.M. Best includes financial impairment in its default definition.

Appendix 2

Creation of Best's Idealized Default Matrices

Best's Idealized Issuer Default Matrix

The tabulation of default rates in this idealized default matrix is based on Best's Financial Strength Ratings (FSRs) of individual insurance operating companies. Specifically, the data used in creating *Best's Idealized Issuer Default Matrix* is the historical default data since 1977 associated with FSRs as shown in the table below. In creating the matrix, significantly more weight was given to the historical default data since 1992 because A.M. Best added more rating notches to its rating symbols in that year and thus more granularity to the rating process.

Table 1: Best's Financial Strength Rating (FSR) Scale

Rating Categories	Rating Symbols & Rating Notches
Superior	A++, A+
Excellent	A, A-
Good	B++, B+
Fair	B, B-
Marginal	C++, C+
Weak	C, C-
Poor	D

Given the raw historical default rates associated with each FSR, A.M. Best converts the FSRs and their corresponding default rates to Best's Long-Term Issuer Credit Ratings (ICRs) using the translation shown in the table below. For example, the FSR of "A-" translates directly to an ICR of "a-" and a "B+" FSR translates to a "bbb-".

Table 2: Translation Table

FSR	Equivalent ICR
A++	aaa aa+
A+	aa aa-
A	a+ a
A-	a-
B++	bbb+ bbb
B+	bbb-
B	bb+ bb
B-	bb-
C++	b+ b
C+	b-
C	ccc+ ccc
C-	ccc- cc
D	c

After the translation process, A.M. Best then applies smoothing techniques and makes various quantitative and qualitative adjustments to produce default rates associated with each ICR in order to create *Best's Idealized Issuer Default Matrix* shown in **Exhibit E.1**.

Best's Idealized Issue Default Matrix

Best's Idealized Issue Default Matrix effectively represents the cumulative default rates of senior unsecured debt. The table is derived from *Best's Idealized Issuer Default Matrix* by applying the notching algorithm shown in the table below. The notching process is generally meant to reflect the greater degree of risk taken by senior unsecured creditors of insurance holding companies relative to that of the operating companies.

Table 3: Notching from Issuer Credit Rating to Issue Rating

Equivalent ICR	Number of Notches from ICR To IR
aaa	0 to 2
aa+	2 to 3
aa	3
aa-	3
a+	3
a	3
a-	3
bbb+	3
bbb	3
bbb-	3 to 4
bb+	4
bb	4
bb-	4 to 5

Best's Idealized Issue Default Matrix shows that for each issue rating, there is an associated cumulative default risk corresponding to the term of the debt being rated. For example, a 10-year structured security issued an “a” rating by A.M. Best is assumed to have a cumulative default risk of 1.31% (by looking at the intersection of the 10-year line and the “a” column in **Exhibit E.2**, barring any other considerations. Conversely, for a known default risk, there is an associated rating. For example, a 10-year structured security with a default risk of 0.69% would be assigned a rating of “aa”, absent any other considerations, by finding the rating implied by the intersection of the 10-year line and the default of 0.69%.

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A.M. Best Rating Services, Inc.
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CHAIRMAN & PRESIDENT Larry G. Mayewski
EXECUTIVE VICE PRESIDENT Matthew C. Mosher
SENIOR MANAGING DIRECTORS Douglas A. Collett, Edward H. Easop,
Stefan W. Holzberger, James F. Snee

WORLD HEADQUARTERS
1 Ambest Road,
Oldwick, NJ 08858
Phone: +1 908 439 2200

MEXICO CITY
Paseo de la Reforma 412,
Piso 23,
Mexico City, Mexico
Phone: +52 55 1102 2720

LONDON
12 Arthur Street, 6th Floor,
London, UK EC4R 9AB
Phone: +44 20 7626 6264

DUBAI*
Office 102, Tower 2,
Currency House, DIFC
P.O. Box 506617,
Dubai, UAE
Phone: +971 4375 2780

*Regulated by the DFSA as a Representative Office

HONG KONG
Unit 4004 Central Plaza,
18 Harbour Road,
Wanchai, Hong Kong
Phone: +852 2827 3400

SINGAPORE
6 Battery Road,
#40-02B,
Singapore
Phone: +65 6589 8400



Best's Financial Strength Rating (FSR): an independent opinion of an insurer's financial strength and ability to meet its ongoing insurance policy and contract obligations. An FSR is not assigned to specific insurance policies or contracts.

Best's Issuer Credit Rating (ICR): an independent opinion of an entity's ability to meet its ongoing financial obligations and can be issued on either a long- or short-term basis.

Best's Issue Credit Rating (IR): an independent opinion of credit quality assigned to issues that gauges the ability to meet the terms of the obligation and can be issued on a long- or short-term basis (obligations with original maturities generally less than one year).

Rating Disclosure: Use and Limitations

A Best's Credit Rating (BCR) is a forward-looking independent and objective opinion regarding an insurer's, issuer's or financial obligation's relative creditworthiness. The opinion represents a comprehensive analysis consisting of a quantitative and qualitative evaluation of balance sheet strength, operating performance and business profile or, where appropriate, the specific nature and details of a security. Because a BCR is a forward-looking opinion as of the date it is released, it cannot be considered as a fact or guarantee of future credit quality and therefore cannot be described as accurate or inaccurate. A BCR is a relative measure of risk that implies credit quality and is assigned using a scale with a defined population of categories and notches. Entities or obligations assigned the same BCR symbol developed using the same scale, should not be viewed as completely identical in terms of credit quality. Alternatively, they are alike in category (or notches within a category), but given there is a prescribed progression of categories (and notches) used in assigning the ratings of a much larger population of entities or obligations, the categories (notches) cannot mirror the precise subtleties of risk that are inherent within similarly rated entities or obligations. While a BCR reflects the opinion of A.M. Best Rating Services Inc., (AMBRs) of relative creditworthiness, it is not an indicator or predictor of defined impairment or default probability with respect to any specific insurer, issuer or financial obligation. A BCR is not investment advice, nor should it be construed as a consulting or advisory service, as such; it is not intended to be utilized as a recommendation to purchase, hold or terminate any insurance policy, contract, security or any other financial obligation, nor does it address the suitability of any particular policy or contract for a specific purpose or purchaser. Users of a BCR should not rely on it in making any investment decision; however, if used, the BCR must be considered as only one factor. Users must make their own evaluation of each investment decision. A BCR opinion is provided on an "as is" basis without any expressed or implied warranty. In addition, a BCR may be changed, suspended or withdrawn at any time for any reason at the sole discretion of AMBRs.

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