Insurance-Linked Securities Rating Criteria

Sector-Specific

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This report updates and replaces the previous report of the same title dated Sept. 23, 2022.

Related Criteria

U.S. RMBS Rating Criteria (April 2023)

Structured Finance and Covered Bonds Counterparty Rating Criteria (March 2023)

Global Structured Finance Rating Criteria (March 2023)

Single-and Multi-Name Credit-Linked Notes Rating Criteria (January 2023)

Insurance Rating Criteria (July 2022)

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Scope

This report provides the global methodology for rating new and monitoring existing insurance-linked securities (ILS) either as the obligations or as counterparty credit risk of special-purpose (re)insurers. ILS refers to various types of transactions whose primary aim is to isolate and transfer specific insurance-related risks to investors or other third parties.

ILS can serve as a vehicle for risk transfer, risk financing or securitization of future cash flows. Examples of transferred risk perils include natural catastrophes, pandemics (extreme mortality) and medical loss ratios. Risk financing may cover excess reserve requirements on life insurance contracts (i.e. Regulation XXX reserves). Securitization transactions may include fees from unit-linked annuities or net cash flows from disability income business.

Key Rating Drivers

Not all rating factors outlined in this report apply to each individual rating. Each specific rating report discusses those factors most relevant to the individual rating assignment. Typically, Fitch rates ILS transactions to the weakest link among the implied rating of the insurance-related risk, the credit rating of the sponsor (or other counterparty exposures involved in the transaction) and the credit rating of the collateral assets.

However, depending on the circumstances, the rating committee may place a higher emphasis on certain factors over others. Depending on the nature of the transaction and structural design soundness, some of those elements may not apply or cause an upward (or downward) movement in the ILS rating.

Nature of Transaction: ILS transactions may vary in structure, contract features and risks; therefore, a principles-based approach is applied. As such, when assigning ratings to a particular transaction, Fitch Ratings will reference master criteria from Structured Finance, Insurance or others based on legal recourse to the sponsor (or premium payer) and isolation of its insurance cash flows.

Structural and Legal Soundness: Fitch will review transaction documents and legal opinions with a focus on the structure performing as described, any inherent risk mitigants and enforceability.

Sponsor, Counterparty and Collateral Account Analysis: Fitch will evaluate the sponsor, counterparty and collateral asset credit and performance risk, and any direct impact on ratings, limitations and surveillance needs. ILS transactions may seek to limit the counterparty exposure of the sponsor or other agents through the use of various structural mitigants, such as capital buffers or counterparty replacement, which can be material to the rating.

Insurance-Related Risks: Fitch will determine an implied rating of the insurance risk based on the perils that are included (or excluded), the underlying data, assumptions and models for the potential cash flow generation to meet coupon and principal payments.

Establishing the Nature of Transaction

For rating methodology purposes, Fitch may analyze ILS using a structured finance (or structured credit) approach, a corporate finance approach, or combine elements of the two reflecting the nature of the transaction. Fitch will determine early in the rating process the applicable or primary criteria. That decision may change during the period if additional facts are presented or alterations are made to the structure. Published commentary will clearly state the applicable master criteria.

When Fitch determines there is a high degree of financial engineering or structuring, the 'sf' modifier will be appended to the credit rating even if it is not considered a "true" structured finance transaction as discussed below. Fitch believes this modifier is a service to investors to signify nuances or restrictions that may be of interest.

Figure 1: Highlighted Difference Between Master Criteria of Structured Finance and Insurance Ratings

	Structured Finance	Corporate Finance
Ratings Available	Provided on debt issuances only. No special-purpose vehicle ratings available, such as Issuer Default Rating (IDR) or Insurer Financial Strength (IFS).	Can include debt issuances and/or counterparty credit risk of special-purpose (re)insurers (e.g. IDR or IFS). Special-purpose (re)insurers must demonstrate economic substance and risk assumption for IDR or IFS to be assigned.
Basis for Rating	Probability of default only.	Probability of default and loss given default (IFS).

Source: Fitch Ratings

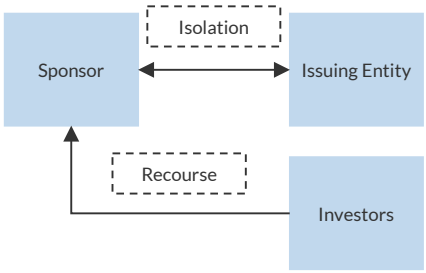
The primary master criteria are typically *Global Structured Finance Rating Criteria* and *Insurance Rating Criteria* as highlighted on page 1. This ILS criteria acts as the sector-specific criteria to address aspects of this asset class and provide further clarity. Figure 1 displays a few distinctions between structured finance and insurance ratings.

Figure 2: Master Criteria Decision Matrix

Legal Recourse to Sponsor (or Financial Guarantor)	Isolation of Issuer's Cash Flows from Sponsor	Master Criteria
No	Weak	Insurance
No	Strong	Structured Finance
Yes	Weak	Insurance
Yes	Strong	Combination of Insurance and Structured Finance

Source: Fitch Ratings

Simplified ILS Structure



Source: Fitch Ratings.

The master criteria decision is based on two broad issues:

1. The level of recourse between investors and the sponsor in the event that investors are not repaid by the issuing entity, and
2. The ability to identify and isolate the insurance premiums and claims between the issuing entity and the sponsor, such as in the event of the sponsor's insolvency or inappropriate draw by the sponsor. Figure 2 outlines the potential combinations and master criteria.

The exact legal and structural form of the issuing entity (IE) in an ILS can vary from deal to deal. An IE in a true structured finance transaction will be a bankruptcy-remote special-purpose vehicle (SPV), and will have a very narrow definition where the SPV has very limited scope and activities. In an insurance-type ILS transaction, an IE may alternatively be known as a special-purpose reinsurer (SPR), a captive reinsurer, or a reinsurance sidecar. These entities, too, will have a limited scope, but not necessarily to the same degree as a "true" SPV.

Legal Recourse to the Sponsor (or Financial Guarantor)

Fitch reviews transaction documents to determine the legal recourse or nonrecourse that investors may have towards the sponsor (or some other entity). When recourse exists, this will typically have the effect of flooring the rating of the ILS at the rating of the sponsor. The exact level of the floor will be based on where the potential for support ranks within the capital structure of the sponsor (i.e. on par with unsecured senior obligations, subordinated, etc.).

The issuing entity may also have performance guarantees from third-party financial guarantors (rarely) or financial support from a parent. The relationship of the supporting entity's rating to the implied rating of the insurance cash flows may influence the rating of the ILS.

In the U.S., regulated insurance companies that become insolvent are not eligible to file bankruptcy. Insolvency falls under the purview of the local state regulator rather than federal bankruptcy laws. As such, an overhanging risk factor is the uncertainty of how the state regulator would behave should the sponsor become insolvent. Depending on the severity of the regulator's behavior, it may lead to a negative rating action by Fitch.

Isolation of Issuer's Cash Flows from the Sponsor

The isolation, or delinking, of an underlying pool of assets is the distinguishing feature of a structured finance transaction compared with a corporate credit. This is typically achieved in structured finance by the "true sale" of an identifiable and specific pool of the originator's assets to an issuing entity so that neither the assets, nor their proceeds on realization, will be available for distribution as part of the bankruptcy estate of the transferor.

The concept of true sale may not apply to all ILS structures since liabilities cannot be sold and an insurer cannot be relieved of its responsibility to policyholders through a reinsurance transaction (e.g. insurers must pay their policyholders' claims even if their reinsurers do not reimburse them). As such, insurance regulation typically stipulates that the ceding insurance company must have unconditional and unrestricted access to collateral assets in order to receive reserve credit on its financial statements.

Therefore, due to the nature of insurance regulation, the degree of isolation is not always clear and Fitch reviews the transaction documents and SPV formation documents as part of its analysis. Fitch evaluates a range of considerations in determining weak or strong isolation of the SPV and its assets, including:

- Potential consolidation of the SPV with an affiliated party and the impact of the transaction on the rated security (i.e. if the ceding insurer or affiliates are the parent of the SPV and holder of the rated securities, the impact of consolidation may be immaterial).
- Limitations on issuing entity activities.
- Limited recourse and nonpetition covenants from transaction creditors.
- Other potential threats to the SPV, such as pension liabilities or tax obligations, are minimized or eliminated.

If isolation is "strong," the ILS rating may be tethered to the sponsor's rating with a modest uplift if the implied rating of the cash flows is considerably higher than the sponsor's rating. If isolation is "weak," the rating of the ILS will be capped by the sponsor's rating. For additional information, see the global criteria report *Global Structured Finance Rating Criteria*.

Reviewing the Legal Structure

Structural Soundness Factors

Fitch reviews certain aspects and factors influencing structural soundness. The following list provides the most common considerations when reviewing the legal structure. Due to varying ILS structures, the list cannot be complete or exhaustive, but is intended to provide an overview. It is subject to change as conditions warrant and some of these factors may not be present in certain transactions.

- Determine the motivation for the transaction including history and background of key parties and issuing entity organizational framework and ascertain if the transaction exhibits economic value or risk transfer.
- Evaluate important counterparty functions and risks and determine if rating opinion is limited by any counterparty (further described below).
- Evaluate the potential ongoing impact of the sponsor (further described below).
- Determine key insurance risk elements, possible peril interactions, or risk reduction such as hedging or reinsurance.
- Analyze the mechanics and operations of the transaction including flow of funds, definition and calculation of defaults, and possible loss scenarios for investors (or policyholders).
- Review priority of payments or waterfall events in the case of multiple security classes or tranching, including any limitations such as minimum solvency ratios or periodic and cumulative actual to experience results.
- Identify any ongoing support features such as top-up requirements for asset portfolios, payment of expenses, tax consolidation and minimum capital ratios.
- Determine surveillance needs by labeling insurance (or actuarial) surveillance reports and payment reports of interest and principal including timing of such reports and producers.
- Review impact of model requirements and changes such as updated assumptions or formula changes.
- Understand termination impact of possible regulatory changes.

Examples of Fitch-Rated Transaction Types

Natural catastrophe bonds: Fitch has rated to the "weakest link" of the following: 1) natural catastrophe risk reaching the attachment point and causing principal deterioration, 2) Issuer Default Rating (IDR) of the ceding (re)insurer that is responsible for the periodic coupon payments, or 3) the credit quality of the collateral assets that can cause a less than full payment of coupons or principal upon maturity.

Life reserve financing transactions: Fitch generally sees credit-link note structures. If a liquidity event occurs, there is a put-like agreement that requires the "risk taker" to provide monies to fund the credit-link note. Thus, the credit-linked note has a pass-through rating of the associated risk taker. If the credit-linked note is funded with identifiable and investable assets, Fitch may notch from the IDR of the risk taker per *Insurance Rating Criteria*.

Value-in-force notes: Fitch tends to see two risk-presenting "legs": one associated with the (re)insurer that is responsible to make the payments and the other tied to insurance-related cash flows. Per the *Single- and Multi-Name Credit-Linked Notes Rating Criteria*, the rating of the note may be the same or one or two notches below the weakest link.

Mortgage insurance: Fitch generally sees credit-linked note structures that transfer the risk related to private mortgage insurance in force on a reference mortgage pool. The notes are typically not dependent on the counterparty rating of the insurer due to the use of a premium reserve account in the name of the issuer, and a structural feature that will terminate the transaction and repay the notes if the ceding insurer is unable or unwilling to pay their obligation. In some cases, the rating of the notes may be capped at the counterparty rating of the trust account holder if the trust funds are not invested in eligible investments.

Transaction Documents and Legal Opinions

Fitch analysts will review key transaction documents when assigning new ratings, to determine whether they reflect the transaction and its structure as represented to Fitch. Analysts may direct questions to the transaction sponsor or other transaction parties, and/or their counsel, about the contents of these documents or seek an explanation of the impact on the rating analysis of certain provisions in these documents.

Fitch expects legal opinions to address the enforceability of the transaction documents and other structural matters. To the extent transaction counsel cannot provide a "clean" opinion on a particular matter, Fitch expects such counsel to identify and explain the impact of such risks. It could be the case that residual legal risk(s) make it impossible for Fitch to rate the relevant securities.

See *Global Structured Finance Rating Criteria* for requested legal opinions.

Evaluating the Sponsor, Counterparties and Collateral Assets

Sponsor/Ceding (Re)insurer Analysis

A key counterparty is the sponsor or ceding (re)insurer of the insurance policies whose importance depends on the type of ILS transaction. For example, parametric catastrophe bonds or credit-linked notes might include minimal weighting of the sponsor analysis, while funded Regulation XXX or value-in-force life insurance transactions may have a greater influence on the overall ILS rating.

In most ILS transactions, investors rely on these parties to pay future premium payments that support the full and timely payment of future interest of the note. Typically, note proceeds are held in a trust account owned by the issuer, so the repayment of principal is less dependent on the sponsor or (re)insurer.

In addition to the ability to pay future premium, the sponsor's credit rating gives Fitch a sense of the quality of the book of business ceded to the special-purpose (re)insurer and an indication of the likelihood of adverse selection or unusual experience. Changes to the ratings of the

sponsor may affect the underlying policyholder behavior, such as continuing premium payments and disrupting the expected insurance cash flows. The sponsor's ratings also indicate the chances of regulatory intervention.

Fitch may use its own ratings or credit opinions (public or private) to evaluate the credit quality of the sponsor. In some cases where Fitch does not rate the sponsor, it may elect to use the lowest credit rating from Moody's or S&P. The requirement of a Fitch rating (or credit opinion) will be determined based on materiality of the sponsor's counterparty risk relative to the transaction rating as a whole, when considering the contribution to the rating of all other risks.

In some cases, the sponsor may not be rated by any rating agency. Fitch will analyze whether there are structural mechanisms in place to mitigate the unrated counterparty risk. For example, a rated reinsurance company may be inserted that serves as an intermediary, or "transformer," between the ceding insurer and the issuer.

Another example is the structure may require that the unrated sponsor prefund a certain number of premium payments and maintain a capital buffer. In such a structure, if any premiums are subsequently not paid by the ceding insurer and the buffer falls below stipulated levels, the transaction is normally unwound and investors will be paid any outstanding balances in full. For Fitch to consider counterparty risk to be mitigated in such cases, the premium account should be in the name of the issuer, not the ceding insurer, barring the presence of any other structural or legal mitigants that would prevent the ceding insurer from accessing and withholding the premium account.

Insurance company credit ratings are determined in accordance with the *Insurance Rating Criteria* as identified on page 1 of this report.

Counterparties — Credit and Performance Analysis

All parties in an ILS structure can influence the rating of the ILS depending on the level of risk or performance they assume. Fitch's approach to assessing counterparty risk is broken down into three steps that ultimately determine the extent to which the rating of the bonds can be delinked from that of the related counterparty. The three steps are:

1. Determining the source of the counterparty risk exposure as either credit risk or operational risk.
2. Categorizing each risk, considering legal and structural mitigants, into one of four risk levels: excessive, primary, secondary or immaterial.
3. Assessing any available counterparty's rating and the transaction's remedial actions upon the loss of that rating, to determine the maximum achievable rating given counterparty risks and mitigants of the transaction.

See *Structured Finance and Covered Bonds Counterparty Rating Criteria* for more information.

Collateral Accounts — Investment Risk Analysis

Proceeds from the note issuance are typically used to purchase collateral assets that are held in a trust account. With the occurrence of an insurance event (such as a covered and significant catastrophe), the collateral assets are liquidated and paid to the sponsor or ceding insurer. If there are no losses, collateral assets will be liquidated upon maturity to fund principal repayment. Noteholders are exposed to the risk of unexpected adverse performance of the collateral assets if they are liquidated in the event of an early redemption or default risk.

Fitch reviews the stipulated investment guidelines to consider the soundness of the collateral assets. This includes a qualitative review of investment guidelines for portfolio credit quality, sector allocations, asset duration, any concentration risk, prohibited asset classes and minimum cash requirements. It may include a quantitative review using Fitch's Portfolio Credit Model or Prism models to determine the level of credit or market risk. Typically, Fitch would look for collateral assets to present minimal market risk to investors.

Yields on invested assets held in the collateral account typically fund a portion of periodic coupon payments. The notes can have either fixed or variable coupons. Variable coupons can be linked to an index return plus a risk premium associated with the insurance risk, or can equal the

insurance risk premium plus a pass through of the actual yield earned on the collateral assets. Swaps can be used to convert floating rate to fixed rate.

Fitch reviews investment performance relative to expectations and market averages. Material adverse deviations in investment performance could lead to a downgrade of the ILS transaction, especially if Fitch believes such adverse investment performance could affect the timely payment of coupons or ultimate repayment of principal. In this context, Fitch notes:

- If the market value of the collateral account investment falls below the amount of outstanding principal due to investment losses (realized or unrealized), depending on circumstances, this could negatively affect the ILS rating. Assume a five-year maturity ILS note supported by fixed-income investments whose market value declined below the principal value in a rising interest rate environment at the time of a periodic ratings review. If investment durations and maturities demonstrate that a "march to par" would allow for a recovery of market value prior to maturity, no action would likely be taken. If asset and liability durations are mismatched and a march to par is questionable, the ILS rating could be downgraded. Ultimately, in the case of fluctuations or changes in investment market values, Fitch considers the likelihood of recovery prior to maturity in evaluating the ratings impact.
- In cases of extreme asset underperformance, Fitch could consider an ILS to be impaired or highly likely to become impaired. For example, if Fitch views investment losses to be permanent with no chance of recovery or ability to repay principal in full (regardless of the relative size of the shortfall), ratings could be downgraded to reflect an inevitable default.
- In the case of a variable coupon that includes a pass through of the yield on the collateral account investments, if portfolio yields fall materially below expectations (measured in absolute terms), this could put downward pressure on the ILS rating, or in the extreme, it could cause Fitch to view the note as impaired with respect to coupon payments. Fitch's perspective is that yield fluctuations tied to normal variances in market interest rates associated with an asset class are neutral to the rating, whereas adverse fluctuations in yield/return that reflect an unexpected deterioration in asset quality are outside ratings expectations. For example, if a money market fund experienced defaults on its commercial paper investments, causing its return to vary materially from other money market funds, Fitch would likely view that as a ratings event for an ILS invested in that money market fund.
- Fitch will only rate transactions with a variable coupon (where a portion of the coupon is a pass through of the yield on the collateral account assets) when: a) the assets are of very high quality (i.e. 'AAA' or 'AA'); b) the note rating is non-investment grade; and c) the pass-through portion of the variable coupon is very small compared with the whole coupon. There are no such ratings restrictions if the variable coupon is linked to a LIBOR or similar index, as opposed to the transaction's collateral asset performance. Also, this restriction only applies at the time of issuance when the initial rating is set.

Analyzing the Insurance Risk

When evaluating the nature of the transaction, Fitch may determine that noteholders are only exposed to counterparty risk and not to the insurance event risk. For example, in life insurance reserve financing transactions (Regulation XXX), the ceding insurer may be seeking a rating on the obligations of the special-purpose reinsurer whose only asset is a "credit-linked note" or a letter of credit. Thus, the rating would be based on the credit rating of the institution supporting that asset. If that is the case, the analysis described in this section would not form part of the rating process.

Where noteholders are exposed to the insurance event risk, the evaluation of the insurance risk is driven by a quantitative, statistical analysis that can range in level of complexity and sophistication. On one end of the spectrum are simple, straight-forward spreadsheet analyses conducted by Fitch; while the other end includes review of output provided to Fitch by the sponsor (or its agents) that was derived from commercially-available, third-party, stochastic models.

In all cases, Fitch will determine if the information it is using is sufficient and robust in its depiction of the insurance risk.

Review the Underlying Exposures

Fitch will evaluate the robustness and sufficiency of the available data of the exposures that are transferred. There should be an adequate distribution of exposures by grouping of characteristics such as policy type (e.g. life insurance by level term period; auto liability by underwriting class); covered policies (e.g. sales period, number, size); geography (e.g. isolated or dispersed); demographics (e.g. age, gender); and reviews historical experience and calculated insurance reserves.

Exposures can relate to policies sold in prior years, or to be sold in future years, or a combination thereof. Fitch expects future sales to meet strict underwriting guidelines with a fair distribution of policies and characteristics.

The sponsor (or its agent) is expected to maintain adequate and proper recordkeeping and system controls to identify and monitor risk exposures. This includes accurate inputting of underwriting standards (e.g. smoker versus nonsmoker, commercial versus residential addresses) and consistent claim-handling routines. Ultimately, the issuer and its advisers are responsible for the accuracy of the information they provide to Fitch and in offering documents and other reports.

Where data is believed to be highly concentrated among a few lives or specific locations, or deemed inadequate, Fitch will not provide a credit rating on the transaction.

Determine the Risk Perils

Fitch will evaluate whether it has the necessary capability to effectively assess the risk peril within an ILS transaction proposal and may decline to rate certain transactions. For example, Fitch believes "man-made" perils, such as a cyberattack or terrorism, pose an ever-evolving risk profile that cannot be robustly modeled without secondary protections in contractual terms and conditions.

Insurance risks can vary greatly. To give readers a flavor of the types of risk that may be present, the following is a short list of risks that Fitch has reviewed:

Mortality/Longevity/Morbidity Risks Investors: Notes may be exposed to insurance risks where the policyholder dies sooner than expected (mortality in the case of life insurance), later than expected (longevity in the case of annuities), or experience deteriorating health (morbidity risk in health insurance or disability income).

Policyholder Behavior Risks: Many life insurance transactions are dependent on the behavior of individual policyholders. Examples include "shock lapses" at the end of a guarantee period as a level term life policy, exercising embedded put options in a variable annuity, or changing premium patterns in a universal life policy.

Natural Catastrophe Risks: Most non-life ILS transactions have event triggers attached to hurricanes, earthquakes, or typhoons. There are several commercial modeling firms that employ structural engineers, meteorologists, and mathematicians to create sophisticated software models.

Non-Property Risks: It is also possible to tie the event trigger to attachment points other than noncatastrophe losses, such as loss ratios tied to a personal auto or commercial auto book of business (or other property and casualty lines). Common actuarial techniques can be employed to determine the variability of the expected loss ratio to establish the trigger loss ratio.

Credit Risk: Assets held in the collateral or trust accounts may experience defaults.

Market Risk (Changes in Yield Curves or Equity Prices): This risk can occur if collateral accounts are liquidated before its scheduled maturity (in the case of fixed income) or if equities are an allowable asset class.

Evaluate the Risk Assumptions

Most transactions employ a variety of third-party experts such as actuarial consultants or risk modeling agencies. These experts may establish assumptions or provide independent commentary on a sponsor's assumptions compared with the industry.

Fitch will typically rely on those experts that set proprietary assumptions that reflect industry convention. In those cases, Fitch will develop a broad understanding of those assumptions for sensibility but will not change those proprietary assumptions in the core risk analysis. Fitch may ask for alternative assumptions for "what-if" scenarios.

A variety of third-party information sources, such as industry studies (e.g. mortality tables), government reports or academic research, may be used by Fitch. Experience studies of actual to expected results offer good insights into the stability (or lack thereof) of these risk assumptions. For example, mortality and lapse studies are routinely performed by actuaries. Likewise, risk modelers provide simulated catastrophe losses to actual events when providing model updates.

If there is inadequate information surrounding the risk assumptions or the experience does not correspond with the assumption, Fitch will not rate the transaction.

Understand the Risk Models and Tools

ILS transactions may employ sophisticated risk models that either project insurance cash flows over a longer period of time (i.e. life insurance premiums and claims) or simulate insured losses (i.e. claims due to hurricane events) under a number of different scenarios. These are often referred to as stochastic models.

Fitch uses output derived either from third-party risk models in its ILS analysis or its internally-validated models (see *Appendix*) and will clearly communicate the origins of the model used in the rating analysis. If the data inputs, model engine or output results do not meet Fitch's expectations of data robustness and reasonable investigation, Fitch will not rate the transaction.

Model inputs or assumptions that anticipate changes in accounting or regulations will not be accepted. These risks are largely outside of the scope of Fitch's rating and may cause an early call of the notes. In some cases, there will be a "make whole" arrangement such that investors are not exposed to this early termination.

Third-Party External Models

When third-party external models are utilized, Fitch selects neither the modeling software nor the independent expert, but makes its own evaluation of the reasonableness and conservatism present in the risk model. Fitch will review the independent expert reviewer's report and modeling documentation including analysis and assumptions.

Generally, these models can be provided by established software firms that have extensive operating performance that is greater than five years. More recently, some software firms (i.e. "fintech") leveraging recent computer advancements (i.e. machine-learning) may have been formed.

ILS transactions can rely on models from external, commercially tested software from independent actuarial firms or catastrophe modeling companies that exist already. Generally, the insured risk can be classified as "low frequency, high severity". These software firms and experts have sufficient operating history, appropriate model and methodology documentation and a demonstration of capturing historical events and possible future outcomes.

Fitch expects these software firms and respective models and results to fulfill three conditions:

- A "use test" whereby the sponsor's management team is actively using the model in its operations. Fitch believes the "use test" mitigates, but does not remove, the risk of "model shopping" since internal risk management reports are aligned with external reports.
- Models should be widely used within the industry with a substantial track record and a vetting process. Fitch believes the industry will not utilize models that consistently understate (or overstate) the risk.

- An independent expert review covers the completeness, quality, and appropriateness of the data used in the model and the assumptions used in the model; the accuracy of the calculations performed; and the suitability of model output.

For third-party external customized models that generally do not have the historical operating performance and do not meet the above conditions, Fitch expects the external modeler to present:

- A model risk management document that explains the governance, policies and controls of the model/platform and operational details surrounding the model and use;
- A model definition document that explains in nontechnical terms the development, implementation and use of the model, including the theory, parameters, calculations and output of the model; and
- A risk analysis report for the specified transaction describing the assumptions used, back-testing analysis, "what-if" scenarios, human reconciliation of the results to current market conditions and providing the validation process for the submitted deal.

Fitch will review these documents and determine if the model is sufficient to use for the specific transaction. That determination will be based on: 1) acceptable industry and company data used in setting assumptions and parameters, 2) sufficient analytical knowledge of the insurance risk, and 3) quality of modelled results.

Some risks may not be captured in the third-party modeled loss statistics. For example, hail damage may not be modeled in natural catastrophe simulation software. If Fitch believes those "unmodeled" risks are material and may influence the implied rating, it may decline to rate the ILS transaction. If these risks are believed to affect the probability of loss, but are not sufficiently material to change the rating category, Fitch will list pertinent unmodeled risks in its rating communications describing their effect.

Third-party risk models will be updated periodically. Aside from assumption updates, advances in computing technology and mathematical formulas could also lead to changes in model results. Depending on the deal documents, this model change risk may be borne by either the investor or the sponsor, and these changes may be beneficial or detrimental to the results and affect ratings under surveillance. If the results of the model changes affect the implied ratings of the insurance risk, this could lead to a change in the rating of the note.

Model change risk can be handled in two possible ways: 1) the original model may be escrowed so that there are no updates (except possibly for assumption changes), or 2) the model may be updated, but the pricing is reset such that the probability of loss remains unchanged.

Review the Cash Flow Projections

Cash flow projections can be dependent on a number of factors covered in the indenture such as minimum capital requirements, tranching of cash flows or cash traps. In such cases, a separate Cash Flow Projection spreadsheet is typically created. Output from the stochastic model may serve as the input to the Cash Flow Projection spreadsheet.

This spreadsheet is customarily developed by the arranger and provided to Fitch for use in rating the transaction. Its purpose is to project the distribution of the insurance-related cash flows according to the priority of payments found in the transaction indenture (e.g. the cash flow waterfall). It must be comprehensive enough to project cash flows to the legal maturity of the transaction. It is also expected to reflect both required and contingent payments (e.g. guarantor step-up fees) and any cash traps or triggers where payments to various parties might be shut off to preserve cash for senior claimants.

Fitch will review the spreadsheet to evaluate its reflection of the priority of payments, examine the calculations and identify default events.

Determine Implied Rating of the Insurance Risk

Fitch uses the probability of default (rather than expected loss) as the modeling statistic for the implied rating of the insurance cash flows. The loss scenarios and probability of default will be ascertained from either the Risk Model or the Cash Flow Projection spreadsheet when used. In either case, Fitch's preference is to use stochastic modeling to derive estimated loss statistics.

Results from this stochastic testing provide an insightful picture as to the number of default events, how they occurred, when the default event occurs, and the amount.

The ILS Calibration Matrix (see Figure 3) shows the Implied Rating along the top of the matrix and a maturity measurement along the side. Smoothing techniques were employed to create an idealized matrix with default probabilities increasing with time and by rating score.

Fitch will determine the appropriate maturity measurement using the following guidelines:

- The "risk time to maturity" dimension of the Calibration Matrix is the lesser of: a) the weighted average life of the liability cash flow stream, or b) the expected maturity date (or weighted average life) of the bond, or c) 10 years.
- The risk time to maturity will be rounded to the nearest integer.
- The risk time to maturity is the period established at the closing of the bond. It will not shorten (or extend) as time elapses.
- Some structures use an annual reset to assess the probability of default and expected loss due to updated exposures or risk models. In such cases, the risk time to maturity is the periodicity of the reset feature.
- Some structures employ an extension period such that the legal final maturity date occurs after the expected maturity date. In these cases, there is usually no longer any additional insurance risk exposure. Consequently, the risk time to maturity is the period to the expected maturity date.

Figure 3: Insurance-Linked Securities Calibration Matrix

(Probability of Default, %)

	Implied Rating																
Risk Time to Maturity (Years)	**AAA**	**AA+**	**AA**	**AA–**	**A+**	**A**	**A–**	**BBB+**	**BBB**	**BBB–**	**BB+**	**BB**	**BB–**	**B+**	**B**	**B–**	**CCC+**
1	0.005	0.010	0.015	0.022	0.030	0.034	0.047	0.189	0.279	0.386	0.548	0.737	1.989	3.015	5.964	10.867	22.274
2	0.017	0.031	0.046	0.067	0.090	0.104	0.146	0.471	0.698	0.956	1.311	1.795	4.451	6.325	11.250	18.703	33.570
3	0.033	0.058	0.088	0.128	0.171	0.199	0.281	0.804	1.191	1.622	2.178	3.012	7.086	9.678	16.131	25.324	41.901
4	0.054	0.092	0.139	0.202	0.270	0.315	0.448	1.173	1.740	2.357	3.117	4.339	9.808	13.013	20.677	31.111	48.519
5	0.078	0.132	0.200	0.287	0.384	0.450	0.642	1.572	2.331	3.146	4.111	5.747	12.571	16.300	24.932	36.256	53.976
6	0.106	0.176	0.267	0.383	0.512	0.602	0.862	1.995	2.959	3.979	5.148	7.218	15.348	19.522	28.924	40.878	58.582
7	0.138	0.225	0.342	0.489	0.653	0.769	1.105	2.440	3.617	4.848	6.219	8.738	18.117	22.668	32.677	45.062	62.533
8	0.172	0.279	0.424	0.604	0.806	0.951	1.370	2.904	4.302	5.749	7.319	10.296	20.865	25.730	36.211	48.868	65.964
9	0.210	0.336	0.512	0.728	0.970	1.147	1.656	3.384	5.010	6.677	8.442	11.885	23.581	28.706	39.542	52.346	68.970
10	0.251	0.397	0.607	0.860	1.145	1.356	1.962	3.880	5.739	7.628	9.585	13.496	26.256	31.591	42.684	55.535	71.624

Source: Fitch Ratings

Once the risk time to maturity is established, the implied rating of the insurance risk is determined where the probability of default is less than the calibrated probabilities.

Fitch will also use the following qualitative guidelines when reviewing the cumulative default rate and calibration matrix:

- For ILS maturities in excess of 10 years, the probability of loss may evolve over time but a long-term expected view will be used. Temporary "blips" will be qualitatively evaluated.
- Fitch will not make arbitrary adjustments to the modeled statistic where it does not have expertise. Fitch may make qualitative adjustments if perceived margins are not sufficient.
- Sensitivity analysis may affect the final rating selection.

Figure 4 provides an application example of the ILS Calibration Matrix. Assume both ILS bonds exhibit the same cumulative probability of default of 2% in year one, 4% in year two and 6% in year three.

- The implied rating for the ILS pool of homeowners policies (Example 1) is 'B+' as the cumulative probability of default (2%) is less than the 'B+' category, but greater than the 'BB–' category using the one-year risk time to maturity.
- For the ILS pool of term life policies, the implied rating would be 'BB–' using the risk time to maturity of three years and the cumulative probability of default (6%) falling in the range between 'BB' and 'BB–'.

Data Sources

Key risk assumptions used in this criteria report are based on the analysis of data received from issuers, arrangers, third-party engineers, consultants and other third-parties, public information as well as Fitch's analytical judgement.

Exposure data is furnished by the sponsor. For natural catastrophe bonds, such information would include property information (i.e. location), replacement value and physical characteristics. For ILS related to life insurance, such information would include policy type, gender, issued age and attained age. Policy terms and conditions would also be included such as deductible and policy maximums for property risks and surrender charges or crediting rates for life insurance products (if applicable),

For the derivation of the default probability of the insurance risk for natural catastrophe bonds, the data source is typically the third party modeler, and for other ILS types, the data source is typically a third-party actuarial firm.

For the credit rating or evaluation of the sponsor, other counterparty exposures involved in the transaction and collateral assets, the direct data source for the ILS team is another Fitch Ratings group. See their respective criteria for their data sources used. Under specific situations Fitch may use the published credit rating from S&P or Moody's as the data source.

Assumptions

The assumptions for counterparty credit ratings are detailed in the appropriate Fitch criteria as illustrated throughout this report.

Assumptions for industry-accepted, third-party risk models are detailed in their respective documentation. This is summarized in risk analysis reports or actuarial analysis reports furnished to Fitch. Certain assumptions include the event generation (the timing and location) and the gross and net amount of loss (the severity or financial impact).

When Fitch uses other Fitch models, those assumptions are listed in either the respective criteria or model definition documents.

When Fitch uses its internal ILS event set to overlay onto deterministic scenarios, the variability and shock assumptions are reviewed by the rating committee. These assumptions are used to stress the cash flows and do not apply to any particular risk peril.

Figure 4: Examples

(Years)	Example 1: Homeowners Policies	Example 2: Term Life Polices
(A) Weighted Average Life of Insurance Company Liabilities	1	15
(B) Expected Maturity of the ILS Bond	3	3
Risk Time to Maturity = Minimum [(A), (B), 10 Years]	1	3

Source: Fitch Ratings

- The variability component is a normal distribution with a mean of 1.0 and standard deviation of 0.25.
- The variability distribution may use another mathematical function if Fitch determines it provides a better fit or a "fatter tail" will be captured.
- The mean may be adjusted if any trend is detected in the historical experience. Fitch estimates the adjustment could range from 0.9 to 1.1.
- The standard deviation may range from 0.15 to 0.35 if the exposure size is larger (or smaller) where the "law of large numbers" would indicate a lower (or higher) historical variability.
- The shock component is a binomial function with a typical annual probability of 5% and a shock of 3x.
- Fitch may alter the shock effect such as a 10% annual probability with a 2x shock if expert opinion and judgment warrant due to the risk involved or exposure diversity (or concentration).
- In the event the loss default distribution is indicating an implied rating of 'AAA', Fitch will create a "super-stress" assumption to understand what is needed to break the deal.

Criteria Disclosures

In Fitch's initial rating reports or RACs, Fitch will disclose certain criteria elements:

- For rating methodology purposes, Fitch may analyze ILS using a structured finance (or structured credit) approach, a corporate finance approach, or combine elements of the two reflecting the nature of the transaction. All published commentary will clearly state the applicable master criteria(s).
- Typically, Fitch rates ILS transactions to the weakest link among the implied rating of the insurance-related risk, the counterparty rating of the sponsor (or other counterparty exposures involved in the transaction) and the credit rating of the collateral assets. However, depending on the circumstances, the rating committee may place a higher emphasis on certain factors over others. These factors and/or analysis will be disclosed.
- Fitch often uses output derived from third-party risk models in its ILS analysis and will clearly communicate the origins of the model used in the rating analysis.
- Fitch will list pertinent unmodeled perils in its rating communications when these perils are believed to affect the probability of loss, but are not sufficiently material to change the rating category.

Variations from Criteria

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. The combination of transparent criteria, analytical judgment applied on a transaction-by-transaction or issuer by issuer basis, and full disclosure via rating commentary strengthens Fitch's rating process while assisting market participants in understanding the analysis behind our ratings.

A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity. Such adjustments are called variations. All variations will be disclosed in the respective rating action commentaries, including their impact on the rating where appropriate.

A variation can be approved by a ratings committee where the risk, feature, or other factor relevant to the assignment of a rating and the methodology applied to it are both included within the scope of the criteria, but where the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.

Ratings, Limitations and Surveillance

Ratings

ILS credit ratings are based on the materials presented by the sponsor and/or its agents. Credit ratings are further described in the Ratings Definitions page, found on Fitch's website.

The determination of the rating is based on the qualitative combination of the structural findings and document review, the credit quality of the counterparties and the evaluation of the insurance-related cash flows and any other relevant factors. Depending on the circumstances, the rating committee may place a higher emphasis on certain factors over others.

Ratings will reflect the current evaluation of risk. Transactions that employ a periodic reset typically restrict the updated probability of default to a specified range (i.e. 1.0%–2.5%). In some cases, the end points may indicate different implied ratings. As an illustration, utilizing the ILS Calibration Matrix (see Figure 3) and assuming a risk maturity of one year, a 1.0% probability of default has an implied rating of 'BB–' while a 2.5% probability of default has an implied rating of 'B+'. When an updated risk analysis report is produced that shows an increased (or decreased) probability of default, Fitch will take appropriate rating actions at that time rather than assuming the most conservative stance.

When any Structured Finance criteria are used, an "sf" designation will be included on any issuance per Fitch policies. This includes those transactions where a "true sale" opinion is not available. In most structured finance transactions, assets are being securitized, and the opinion is confirming that the assets have been effectively sold to the SPE and segregated from the general credit quality of the issuer. However, in most ILS transactions, a liability is being securitized and by definition liabilities cannot be sold. Thus, an opinion on the "sale" is not possible or even applicable. Instead, Fitch evaluates the structure to make sure similar economics of a true sale are achieved with respect to the liabilities, including evaluating if the cash flows from the liabilities are segregated and the if the SPE is segregated from the general credit quality of the sponsor.

If the ILS transaction uses the *Insurance Rating Criteria* as its primary criteria, the rated securities will be subject to notching from the Issuer Default Rating (IDR) of the sponsor. Issue ratings can be notched up or down from an applicable IDR depending on expected recoveries. See Insurance-related criteria for additional details.

Fitch rates ILS transactions to the risk of impairment, where impairment occurs when expected principal and interest are not paid in full and timely manner (subject to any defined, reasonable grace periods). This concept is important in ILS, because at times, events of default in ILS transaction documents are narrowly defined and may exclude losses caused by the core insurance or event risks. The following list, though not exhaustive, provides some examples:

- Even if not defined as an event of default in the transaction documents, a loss of principal or interest due to an insurance loss (such as a catastrophe event) would be treated by Fitch as an impairment. Ratings would be appropriately adjusted by Fitch to reflect an effective default.
- An early redemption event is not an impairment as long as principal and all accrued interest payments due prior to redemption are paid in full. In contrast, an early redemption event where, for whatever reason, the redemption fails to return all principal and accrued interest in a timely manner would be considered an impairment. An early redemption may be triggered in some ILS structures if certain counterparties fail to perform.
- Investment losses within a collateral account that cause a loss of principal and/or a missed or partially missed coupon payment (outside a reasonable defined grace period) would be considered impaired. An impairment would be considered to exist regardless of the size of the ultimate loss.

In one case Fitch views as unique to ILS, if the coupon on the transaction is variable where a portion of the coupon represents a pass through of the actual yield earned on collateral assets, normal fluctuations in yield or market value would not be considered an impairment, even if the yield turns negative. However, in cases of extreme underperformance, Fitch may judgmentally

determine that underperformance is so severe that the ILS is effectively impaired with respect to coupon payments and lower the rating accordingly.

Rating Relationships

The strength of the legal recourse and cash flow isolation defines the maximum attainable rating:

- Where it is possible to achieve a "true sale" of insurance-related assets, the notes issued by the issuing entity may be rated higher than the sponsor if the modeling results indicate a higher rating.
- Where a true sale is not achieved, it still may be possible for the ratings of the notes to be higher than the sponsor. Usually, the uplift is limited to one or two notches and remain aligned to the ratings of the sponsor. This is highly dependent on the results of the loss modeling and the strength of the structural mitigants within the transaction.
- If the structural mitigants are weak, the rating opinion may be capped by the "weakest link" from the rating of the counterparties, sponsor or cash flows in isolation.

Rating caps may be imposed if:

- Tranches are exposed to losses from a single event (e.g. one hurricane).
- Stress testing indicates a sharp migration risk.
- Fitch deems the ILS as highly unusual or esoteric.
- *Global Structured Finance Rating Criteria* provides other examples and clarifications when rating caps may be employed.

It is unlikely that any ILS will be assigned Fitch's highest rating (AAA) due to the low frequency/high severity nature of the insurance risk, limited historical experience and performance, and heavy reliance on complex models.

Ratings may be lower than the perceived weakest link for several reasons:

- There is a two or more notch decrease in the implied rating of the insurance risk under reasonable stress scenarios.
- There are structural features that allow the sponsor to materially increase the level of risk without stipulated benefits to noteholders.
- There are multiple counterparties where a default of any counterparty is independent and several rather than dependent ("first to default"). In other words, counterparty A or counterparty B can cause a default event versus a default of both counterparty A and counterparty B having to occur jointly to define a default event.
- The transaction involves an esoteric asset class that has not necessarily stood the test of time and lacks common industry practices or regulatory approvals.

In certain cases, Fitch's forward-looking views related to risk exposures or forecasts may dominate a rating conclusion and such views may be based on factors that are highly subjective. There are a large number of issues that can potentially have credit rating implications and the agency's internal analysis and external communication will be limited to those issues that Fitch considers material and most relevant to its ratings.

Surveillance

Ratings are reviewed at least annually, but may be reviewed more frequently if an insurance event (such as a natural catastrophe) occurs or if the credit quality of the sponsor or a key counterparty changes.

Fitch expects to receive periodic financial and accounting reports of the issuing entity and any trust accounts. This should include any statements regarding minimum capital requirements or other credit enhancements. In addition, monitoring reports should be provided identifying current exposures and risk performance.

Where the ILS is exposed to credit or investment performance risk, Fitch expects to receive asset management reports. This should include sector analysis, performance attribution, risk durations, and any investment guideline violation and cures.

Fitch also expects to receive notifications of timely coupon and principal payments.

If cash flows have changed dramatically or the economic environment has shifted considerably, Fitch may ask the sponsor (or its representative) to provide updated information and modeling results. This may include when the underlying insurance/actuarial model has changed.

Fitch will withdraw a rating if surveillance materials are not provided in a timely fashion or lack adequate information.

Rating Assumption Sensitivity

Fitch judges the adequacy of the underlying assumptions and model results by reviewing sensitivity tests intended to gauge the impact of small assumption changes on modeled results. Fitch may decline to rate the transaction if there is a significant impact on the implied ratings from such marginal changes.

Fitch may also review stress tests that are intended to see how large dramatic one-time shocks can affect modeled cash flows; in other words, determine the event that would cause a bond default which may not be apparent in the sensitivity testing. Stress tests are dependent on the model utilized or reviewed. For example, most natural catastrophe models have extreme events simulated in their catalogue of events. Stress events are determined by the risks inherent in the note (for example, equity price movements may or may not be a risk element).

It may not be possible, practical or desirable in all cases to stochastically model all risks. In these cases, Fitch may use prescribed deterministic scenarios typically provided by a third-party related to the specific transaction. In some cases, Fitch may believe the baseline scenario to be too optimistic or that it requires a margin of conservatism. As such, Fitch will review the scenario output for reasonableness and select the appropriate scenario based on its judgment of the risks.

Finally, deterministic scenarios can also serve as a sensibility check for the stochastic results. These stress tests gauge the variability of results to certain key assumptions such as mortality shocks, adverse lapsation or asset default experience.

ILS bond ratings can be upgraded or downgraded, placed on rating watch, or assigned outlooks. The events that might trigger a Rating Watch or a change in rating include but are not limited to:

- The occurrence of a triggering event (e.g. hurricane, pandemic) or a first (or subsequent) event in a bond with a multi-event trigger.
- In Fitch's opinion, the probability of loss has changed when actual cash flow experience substantially deviates from original expectation.
- A change in the modeled probability of default or recovery rating.
- Third-party modelers issue a new version of a model that materially changes modeled loss statistics.
- Change in the credit quality of a key counterparty (e.g. sponsor or swap counterparty). Fitch maintains ratings on most major insurers, banks, and counterparties. Thus, surveillance of those entities occurs in the normal course of maintaining those ratings.
- An event of default under the notes' indenture (e.g. a failure to pay premiums or an insolvency proceeding) has occurred.
- Material decline in the quality or performance of collateral assets.
- Changes in accounting, legal or regulatory environments.

Ratings will not change simply due to the passage of time, as long as all other rating assumptions established at inception remain within expectations. For example, a one-year catastrophe bond subject to hurricane risk will not be upgraded at the end of hurricane season.

Criteria Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's Ratings Definitions and available at https://www.fitchratings.com/site/definitions.

Appendix

Fitch Internal Models

Where applicable and appropriate, Fitch may use its own internally validated risk models used by the Insurance, Structured Finance or other groups. To date, this has been rare.

Where applicable and appropriate, Fitch may create an event set of pseudo-random numbers using expert opinion assumptions and mathematical distributions. This allows Fitch to convert a deterministic (or static) cash flow projection stream, furnished by the arranger or independent third party, into a distribution of financial outcomes.

The event set may be divided into two functions. One function acts as general yoy variability from the expectations using a normal distribution with a mean and standard deviation (or some other distribution). For example, there are standard mortality tables used by actuaries, where over the long term, those mortality rates may be true but in any single year, the mortality rate could be slightly higher (or lower).

The second function serves to "shock" the rates and tries to capture tail-like events. Such events could be 1) a drastic equity drop causing a severe market value loss, or 2) a credit downgrade of an insurer that causes a "run on the company"-type scenario, or 3) a severe pandemic that significantly increases mortality rates.

Each ILS transaction is unique based on the number of policyholders, or the type of product or the risk mitigants. As a consequence, the risk factors and parameters are determined by expert judgment and opinion. These are disclosed to and reviewed by the rating committee.

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