

Procedures and Methodologies for Determining Credit Ratings

Fitch's procedures and methodologies for assigning ratings are consistent with the Fitch Ratings Code of Conduct, and are documented in detail in published criteria and methodologies and internal policies and procedures. A description of the key procedures and methodologies is contained in the attached documents:

1. A summary of Fitch's qualitative and quantitative metrics described by sector.
2. "The Ratings Process" summarizes Fitch's processes for assigning credit ratings, including a) initiating and monitoring ratings; ii) initiating ratings on new or complex transactions; and iii) developing, amending and evaluating criteria.¹
3. Fitch uses credit ratings of other credit rating agencies in assigning ratings to CLOs and CDOs, and, in rare instances, in its analysis of the credit quality of the assets in ABCP conduits. Fitch's methodology as it relates to the use of other credit rating agency ratings is described in the "CLOs and Corporate CDOs Rating Criteria," published September 8, 2022, and in the "Structured Finance CDOs Surveillance Rating Criteria," published September 17, 2021.

¹ Note that Fitch views models as part of our criteria. Thus, where a model forms a key part of our rating process, the model and its applications are described within the relevant criteria report.

Corporates

Qualitative Metrics

The fundamental characteristics of each sector lead to varying typical rating ranges depending notably on their inherent exposure to volatility and business risk, either past or prospective.

The qualitative factors differ per industrial sector but often include considerations related to sector competitive intensity (competition, barrier to entry/exit, power within the value chain), sector trends (growth potential, volatility of demand, threat of substitution), and diversification (product and geographic).

The analysis also factors in the operating environment in which a corporate issuer operates and includes the location of its revenues, income and assets, its funding environment and the systemic governance in the respective location. Since companies can succeed and fail in various environments, it is neutral to the rating in most cases. However, the challenges posted by such factors in emerging markets could lead to lower ratings than would otherwise be the case. Foreign-currency ratings may also be constrained by the Country Ceiling, which is Fitch's view on the transfer and convertibility risk. Overlaying quantitative approaches to credit analysis, a qualitative assessment of management quality, strategy, and idiosyncratic corporate governance factors may influence ratings.

Quantitative Metrics

The quantitative metrics measure cash flow, earnings, leverage and coverage to assess credit risk. Metrics include earnings before interest, taxes, depreciation or amortization (EBITDA)- or Funds from Operations-based profitability, leverage, and coverage ratios to assess a rated entity's cash flow generation relative to its debt service requirements. Liquidity analysis focusses primarily on the ability to generate sustainable internal cash generation from operations rather than a year-end cash position, where largely uncovenanted structures allow management to divert to equity thereby potentially creating imbalances versus debt stakeholders' interests.

Specific quantitative metrics can be used, and often are more appropriate in relation to different risk profiles derived from Fitch's qualitative assessment of the rated entity.

Banks / Financial Institutions

Qualitative Metrics

The qualitative metrics are used to assess the entity's intrinsic creditworthiness and, in certain cases, the likelihood of receiving external support. The intrinsic creditworthiness assessment first considers the operating environment, and then the business profile, risk profile, and financial profile. The risk profile assessment includes evaluation of underwriting standards, risk controls, growth and market risk. The financial profile analysis aligns with the type of financial institution as well as consideration of the operating environment. Support considerations evaluate the likelihood that the entity will receive extraordinary support - typically from either the owner(s) or sovereign. While sovereign support is often a rating factor for banks, it is less common for other non-bank financial institutions.

Quantitative Metrics

The quantitative metrics for banks are used to assess the operating environment and business profile as well as the four financial profile factors: asset quality, earnings and profitability, capitalization and leverage and funding and liquidity. The operating environment assessment considers GDP per capita and a ranking using Fitch Solutions' Operational Risk Index. The business profile assessment considers the assigned operating environment score and operating income. Each financial profile factor assessment starts with an implied score based on the assigned operating environment score and a factor specific metric. The core metrics for each factor are as follows: impaired loans to gross loans ratio for asset quality, operating profit to risk-weighted assets for earnings and profitability, core capital ratio for capitalization and leverage, and loans-to-customer deposits for funding and liquidity. All primary bank metrics are reviewed in coordination with complementary metrics where appropriate, in conjunction with analytical judgement, to inform the final assessment for each financial profile factor.

For each non-bank financial institution subsector - which includes securities firms, investment managers, business development companies, finance and leasing companies and financial market infrastructure firms – Fitch uses a set of core and complementary metrics that align with the entity's risk profile.

Insurance

Qualitative Metrics

The primary qualitative factors for insurance ratings are an assessment of industry profile and operating environment, business profile, ownership, and corporate governance and management. These elements can serve to limit or cap a rating as can be the case with corporate governance, establish a foundation for solid creditworthiness based on the need for financial strength and a strong regulatory environment in the industry profile and operating environment evaluation. The sector(s) that an insurance company operates within is an important aspect in the evaluation of the operating environment. The business profile takes into account competitive positioning and key business risks that help assess the sustainability of an entity's creditworthiness. Factor performance is compared to principals, guidelines, and relative to peers. Insurance ratings consider the nature of the regulatory regime, and the relative credit quality of various members inside the organization as well as various components of the capital structure.

Quantitative Metrics

The key quantitative factors for insurance entities are capitalization and leverage, debt service capabilities and financial flexibility, financial performance and earnings, investment and asset risk, asset/liability and liquidity management, reserve adequacy, reinsurance and risk mitigation, and catastrophe risk. Primary metrics include net premiums-to-capital, total liabilities-to-capital, capital adequacy ratios (both regulatory and per Fitch models), and financial leverage. Operating performance is considered through the combined ratio for non-life insurers and pretax return on assets for life insurers. Asset quality is reviewed by risky assets-to-equity, non-investment grade bonds-to-equity and unaffiliated common stock assets-to-equity. Liquidity is measured by liquid assets relative to liabilities. Reserve quality (for property/casualty) is considered by net leverage, reserve development-to-equity, reserves-to-earned premium, and calendar year paid losses-to-calendar year incurred losses.

Public Finance / Sovereigns

Qualitative Metrics

The qualitative metrics for public finance ratings are the institutional framework and sector risk profile, economy, revenues, expenditures, and debt. The institutional framework and sector risk profile considers the legal, structural, and regulatory environment as well as the macroeconomic factors that provide the backdrop against which the other key rating factors are evaluated. Revenues are considered, and the demand and pricing characteristics that influence revenue volatility, and the tools available to the issuer to respond to fluctuation in demand. The issuer's expenditure framework, including predictability and volatility of costs are considered. Operating/financial performance considers the level of financial flexibility an issuer can sustain as it encounters stresses expected to occur over the relevant forecast period. Other risks, such as debt structure, management and governance, and legal and regulatory risks are also considered when assigning a rating. These risk factors are not scaled, and only weaker characteristics affect the rating.

Sovereign credit analysis emphasizes the structural features of the economy that render it more or less vulnerable to shocks, including the risks posed by the financial sector, political risk and governance factors; and macroeconomic performance, policies and prospects, including growth prospects, economic stability and the coherence and credibility of policy. Sovereign ratings consider an issuer's finances, including budget balances, the structure and sustainability of public debt and fiscal financing; the sustainability of current account balances and capital flows, and the level and structure of external debt.

Quantitative Metrics

The quantitative metrics for U.S. tax-supported credits include historical tax revenues, direct debt, and adjusted net pension liability. The long-term liability burden is calculated as direct debt+adjusted net pension liability as a percentage of personal income. For revenue-supported credits, leverage is considered by net debt plus other liabilities to Cash Flow Available for Debt Service (CFADS) or EBITDA, which provides an indication of the cash flow from core operations which is available for the payment of debt service. Days cash on hand measures the number of days that an organization could continue to pay its average daily cash obligations from its current cash position.

Sovereign ratings use a model that considers several metrics, such as GDP per capita, inflation, government debt levels and reserve currency flexibility. The rating model output is supplemented by additional qualitative analysis which can adjust the model output up or down three notches to reach a final rating conclusion.

Infrastructure and Project Finance

Qualitative Metrics

The qualitative metrics address the issuer's ability to generate a stable cash flow based on its legal framework and fundamental economics. Where material to the rating, risks that may cause the facility not to be completed on time, on budget, and/or up to the performance standards assumed for the operating period credit profile (completion risk) are evaluated. Operating cost, demand, revenue, and infrastructure renewal risks that affect the ability to make debt service payments (operation and revenue)

are considered. Financial profile analysis considers the financial flexibility as a facility encounters stresses expected to occur over the forecast period. The Debt Structure analysis assesses protections in the transaction structure to ensure timely payment of debt service. This encompasses an assessment of payment waterfall ranking, refinance risk, financial profile, covenant package, structural features, hedging financial risk, liquidity and reserves. The level of financial flexibility that a facility demonstrates is considered as it encounters stresses expected to occur over the relevant forecast period. Counterparty risk (off-takers, concession grantors, warranty providers) is assessed for each risk factor. Country risk factors, industry specific risks, and the facility's exposure to event risks and mitigating factors to such risks are accounted for in the final rating.

Quantitative Metrics

The quantitative metrics considered are the Debt Service Coverage Ratio (DSCR); leverage ratio, which is the ratio of net debt to CFADS or net debt to EBITDA; project life coverage ratio, which is the net present value (NPV) of CFADS over the remaining project life, divided by the principal outstanding on the rated debt instrument (plus all equal-ranking and senior debt) at the calculation date; and loan life coverage ratio, which is the NPV of the cash flow available for debt service, from the calculation date to the maturity of the rated debt instrument. Other metrics such as Interest Coverage Ratio (ICR), Maximum Annual Debt Service (MADS) and Net Debt to Regulated Asset Base are also used.

Structured Finance

Qualitative Metrics

The qualitative metrics consider qualitative components of asset quality – such as measures of physical quality and opinions on potential volatility; strength of transaction participants, including originators, servicers, and other counterparties, as well as a legal analysis analyzing the isolation of the collateral pool from the originator which forms the assumption that the credit analysis is based on the collateral itself, rather than the originator.

Quantitative Metrics

The quantitative metrics for structured finance are an estimate of expected losses, which typically consists of two sub-components: a probability of default and loss severity/expected recovery. Both of these sub-components are typically related to the collateral of the transaction. Expected losses at the asset level are also influenced by quantitative assumptions on multiples (extrapolation between expected losses under an expected case and under higher stresses), and transaction-wide metrics, such as portfolio concentration.

Other important quantitative factors are cash flow related, including timing of the cash flows of both the transaction's assets (collateral) and liabilities (bond structure) and interest rates assumptions.



FitchRatings

The Rating Process

How Fitch Assigns Credit Ratings

The Ratings Process

How Fitch Assigns Credit Ratings

Fitch Ratings' credit ratings provide opinions on relative vulnerability to default or loss.

This report replaces the report of the same title dated May 22, 2019.

Related Research

[Rating Definitions](#)

[Rating Criteria](#)

[Code of Conduct and Ethics](#)

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Fitch Ratings' credit ratings provide opinions on the relative vulnerability to default or loss. To arrive at the rating opinion, Fitch follows standardized procedures, as described in this report, to ensure a globally consistent approach to its rating processes.

For the purposes of this report, a "credit rating" refers only to an international scale credit rating and the rating process described relates solely to Fitch's international credit ratings. References to an "issuer" may mean an issuer, entity or transaction.

Initiating the Ratings Process

The rating process usually begins when an issuer, sponsor/arranger or underwriter, or, in any of these cases, its agent, contacts a member of Fitch's Business and Relationship Management (BRM) group with a request to engage Fitch to provide a credit rating.

Alternatively, Fitch may initiate rating coverage on an unsolicited basis, where sufficient public information is available, to broaden industry coverage or provide insight to market participants.

Assignment of the Analytical Team

Managers' Role: Managers leading the relevant credit rating group will assign a primary and secondary analyst to lead the analysis, formulate a rating recommendation and bring the recommendation to a rating committee. These analysts are usually responsible for the monitoring or surveillance of the credit rating after it is assigned.

Structured Finance Ratings: For structured finance, once an initial credit rating is assigned, surveillance is typically transferred from the primary analyst to a dedicated surveillance analyst, although day-to-day surveillance activities may remain with the primary analyst for some structured finance asset types.

U.S. Public Finance Ratings: For U.S. public finance, the primary analyst is responsible for leading the analysis and formulating a rating recommendation but surveillance responsibilities vary by sector.

Analysts' Role: Fitch analysts conduct their reviews in a manner consistent with published criteria applicable to the issuer and asset class, which may vary by region. Analysts and committee members are required to consider relevant qualitative and quantitative factors as defined in applicable criteria and methodologies.

Analyst coverage may be rotated over time as deemed appropriate by analytical group managers and in accordance with Fitch's policies and procedures, reflecting applicable laws and regulations.

Information Used to Determine a Credit Rating

Analysts base their rating analysis on a thorough review of information known to them and believed to be relevant to the analysis and the rating decision in accordance with the applicable criteria.

The rating process incorporates information provided directly to Fitch by the issuer, arranger/sponsor or other third party. This may include background data, management forecasts, risk reports, performance information or other proprietary information.

In most cases the issuer's management or transaction sponsor participates in the ratings process via in-person management and treasury meetings, on-site visits, teleconferences, and other correspondence.

Analysts also consider macroeconomic data, market events and any other information deemed relevant for rating analysis, such as data regarding an issuer's peers, data provided by other analytical groups within Fitch or publicly available information.

The analytical team conducting the analysis will determine if sufficient information is available to form a view on the creditworthiness of the issuer. The rating committee will also consider whether there is sufficient information to assign a credit rating.

If Fitch believes that the information available, both public and private, is insufficient to form a rating opinion, no credit rating will be assigned or maintained. Fitch will withdraw that credit rating if sufficient information ceases to be available in relation to an existing credit rating.

Fitch relies on information in its analysis from sources it believes to be credible. The agency conducts a reasonable investigation of factual information relied upon in its analysis by obtaining reasonable verification of that information from independent sources to the extent such sources are available. Issuers, or arrangers/sponsors, may choose not to share certain information with external parties, including rating agencies, at any time.

While Fitch expects that each participating issuer in the rating process, or its agents, will supply promptly all information relevant for evaluating both the credit ratings of the issuer and all relevant securities, Fitch neither has, nor would it seek, the right to compel the disclosure of information by any issuer or any agents of the issuer.

Pre-Committee Process

Where a debt issue or financial structure is deemed to have unique or complex features or does not appear to have a fundamental economic purpose, a screening committee (SC) may be held to determine whether the full rating process should proceed.

A SC is not a rating committee but is rather a cross-sector committee that provides an initial layer of review to consider such rating proposals early in the rating process.

The primary purpose of the SC is to determine the feasibility of assigning a credit rating to such proposals, which may need a cross-sector review to assess how certain credit risks should be considered and which rating criteria may be applied.

The Committee Process

Credit ratings are assigned and reviewed through a committee process. Once information has been collected and the issuer and/or securities are analyzed in accordance with Fitch's criteria and methodologies, the primary and secondary analyst will form a rating recommendation and document their analysis and rationale in a committee package.

Committees consider the information and rating recommendation presented in the committee package and discuss the recommendation. The committee package must contain sufficient content, consistent with the methodology and criteria that apply to the analysis, to provide a solid basis for the recommended credit rating.

The package must include a summary of key rating drivers, sensitivity analysis, criteria variations, if any, and details of reasonable investigation, among certain other minimum content.

Voting members are chosen based on relevant experience, with seniority and experience thresholds reflected in Fitch's committee quorum requirements. The minimum committee voting quorum for credit rating decisions is five, subject to limited exceptions, and a maximum of nine, although committees often include non-voting observers.

The committee's voting quorum must include:

- A chair that moderates the committee and ensures it is conducted in accordance with Fitch's policies and procedures; and
- At least one independent member from outside the immediate asset class, sub-sector or geographic area of the entity under review, subject to limited exceptions.

The rating committee considers relevant quantitative and qualitative factors, as defined in Fitch's established criteria and methodologies, to arrive at the credit rating that most appropriately reflects both current and prospective performance.

A rating committee may adjust, or vary, the application of the criteria to reflect the risks of a specific transaction or entity. All such criteria variations are disclosed in the respective rating action commentaries, including their impact on the credit rating, if any.

A variation can be approved by a rating committee where the variation is in relation to a risk, feature or other factor that is relevant to the assignment of a credit rating and where this and the methodology applied to it are both already included within the scope of the criteria.

Where the analysis described in the criteria would require modification to address the risk, feature or factor specific to the particular transaction or entity, approval would then be sought for new or amended criteria.

Analysts maintain a dialogue with the participating issuer during the rating process to resolve any outstanding questions and to request additional information. A credit rating is assigned if the committee agrees on a rating level and that the information supporting that rating decision is sufficient and robust.

Committee decisions are reached by consensus, while individual committee member votes and individual views expressed are not recorded, except in the case that a member of the quorum appeals against a credit rating.

If a committee member is not able to accept the consensus opinion, then they must initiate an internal appeal. In addition, an internal appeal must be launched by the chair if a consensus view cannot be reached.

An internal appeal involves a new committee being held typically within two business days of the original committee and with at least two new committee members in the quorum to consider the original committee package, the consensus recommendation and a summary of the appeal.

A further internal appeal is possible if one is launched by a new committee member, such a second internal appeal committee will be decided by majority if no consensus is reached. In the event that the chair determines that further analysis or information is required before the committee can move to a vote, the committee will be suspended to allow this material to be gathered. Committee members and the chair must also make certain attestations with respect to the independence and objectivity of the rating process that was followed.

In limited circumstances, credit ratings that have been determined by a rating committee may be applied to new debt issues without holding a further rating committee, provided that the class of debt concerned was considered by the previous committee and the credit rating is applicable to that class of debt or is *pari passu* with the class of debt.

In all such cases, Fitch identifies the date of the relevant prior rating committee in the new debt issue rating announcement. By contrast, if the class of debt has not previously been considered in a rating committee, then a rating committee must be held to assign the credit rating to the new issue.

There are also other limited circumstances where rating committees may not be required, for example, converting an expected credit rating to final, provided nothing substantial has changed.

Issuer Notification and Rating Dissemination

Once the committee concludes, the outcome is communicated in writing to the issuer or, where applicable, its arranger/sponsor/agent. The issuer notification requirement is subject to certain exceptions (except where the lead analyst is based in an EU-registered entity or a branch of an EU-registered entity).

Such exceptions include:

- i) to address time-sensitive, event-driven rating actions, for example, in response to the announcement of a merger or acquisition; in such cases, issuer notification is given as soon as practical after publication of the credit rating;
- ii) to address bulk rating action reviews in U.S. structured finance;
- iii) to address cases where Fitch does not have an appropriate contact, e.g. certain non-participating issuers; and
- iv) to address rating actions taken on certain dependent credit ratings.

In communicating the credit rating to the issuer, or arranger/sponsor/agent, the rating action and the principal grounds on which the credit rating is based must be explained. Typically, analysts use a draft rating action commentary or a draft presale report, which includes the committee's ratings decisions, to convey this information.

The primary analyst provides the issuer, or arranger/sponsor/agent, with the opportunity to review Fitch's draft rating action commentary, or presale report, to allow the issuer, or arranger/sponsor/agent, to check for factual accuracy and the presence of non-public information.

Fitch evaluates this feedback from issuers while retaining full editorial control over its commentaries. The primary analyst records the issuer's response in Fitch's publishing application before a rating action commentary is released.

However, if the issuer provides verbal feedback, the primary analyst will contact the issuer representative in writing to confirm the nature of his/her feedback and that the credit rating will be published.

Fitch typically aims to publish rating actions on existing public credit ratings by the end of the next business day following the conclusion of the committee, unless the credit rating is subject to external appeal or subject to other conditions, such as regulations governing the notification time period. The notification period must be at least 24 hours before publication of the rating decision or outlook.

If the issuer provides feedback within the notification period that it has no outstanding comments, the credit rating may be published before waiting for the specific notification period to elapse. Fitch aims to publish new public credit ratings shortly after the rating committee and subject to the same considerations as outlined above.

However, the exact timing of new credit rating announcements can be affected by other factors. For example, if the credit rating relates to a new debt issue, Fitch's procedures require it to delay its rating announcement until materials, with respect to the debt issue, are in the public domain.

All rating actions for new or existing publicly-rated issuers/securities are published on Fitch's website and released to major newswire services. These rating action commentaries provide a rationale for the rating decision based on key rating drivers and sensitivities, identify the criteria applied in the rating process, detail any material sources of information used to prepare the credit rating, other than those described in criteria, indicate if an issuer did not participate in the credit rating and describe any criteria variations that were applied, among certain other disclosures.

The timing of publication reflects the important balance between allowing sufficient time for the issuer to review the rating rationale for factual accuracy, the presence of confidential information and providing users of credit ratings with timely and objective opinions.

In addition to Fitch's rating action commentaries, a research report may be published about issuers individually or by industry and made available to subscribers to Fitch's website.

External Appeals

An issuer may request an appeal of a rating decision, referred to as an external appeal, but there is no specific right to an appeal. Appeals will only be granted when an issuer provides new or additional information in a timely manner that Fitch believes is relevant to the credit rating.

Where such an external appeal request is received, an appeal review panel will be convened to review any additional information provided and determine whether it warrants granting an external appeal of the rating decision.

Where an external appeal is granted, a new committee is convened to reconsider the rating decision. This committee is composed of the chair of the original committee, senior-level analysts who did not attend the previous committee and certain members of the original committee.

Fitch endeavors to complete the appeal review of new credit ratings as quickly as possible, preferably within two business days. In cases where the review of an existing credit rating is not finalized during the two-day time frame, the credit rating may be placed on Rating Watch.

In the event that an external appeal committee results in a rating decision that is different from the original committee decision, this will be disclosed in the rating action commentary. The commentary will note the original rating outcome was subject to appeal and that, following the appeal, the rating outcome is different from the original decision. The original rating committee decision will not be included in the published commentary.

Rating Surveillance

Fitch's credit ratings are typically monitored on an ongoing basis and the review process is a continuous one. Monitored credit ratings are also subject to a review by a rating committee, at least once annually.

Certain sovereign and international public finance credit ratings are reviewed at least every six months, according to a calendar of scheduled review dates. Point-in-time credit ratings are not monitored on a continuous basis. Such credit ratings are usually private, but where they are published, they are clearly disclosed as "point-in-time" in the accompanying rating action commentary.

Analysts will convene a committee to review the credit rating instead of waiting for the next scheduled review if a business, financial, economic, operational or other development can reasonably be expected to result in a rating action. For example, operational or fiscal deterioration, an acquisition, a divestiture or the announcement of a major share repurchase may be events that trigger an immediate rating review.

Peer analysis is a surveillance method that may be primarily used to assess the relative performance of comparable entities and transactions over time. Peer groups are created based on similar fundamentals and rating levels, among other factors.

Results of Fitch's peer analysis are included in research, such as a Ratings Navigator, a peer comparison tool used with respect to certain sectors that provides a graphical representation of key rating drivers against peer expectations for a given rating category. Fitch may choose to conduct portfolio reviews for peer entities whereby all the entities are subject to a rating review at the same time.

Scenarios for structured finance are generally based on quantitative metrics. In addition, ratings performance may be monitored with surveillance tools to evaluate the effect of stress scenarios on transactions.

Such tools will typically track data from surveillance reports provided by the trustee and compare the information against original and stressed expectations to "flag" transactions where performance has diverged from established parameters.

Forward-Looking Ratings

Credit ratings reflect Fitch's views of future performance based on historical performance through various economic cycles, and Fitch's opinion as to how future performance may evolve. Event risk is not considered in most credit ratings and, as a result, credit ratings may change due to events, such as a merger, an acquisition, fraud, litigation, sudden weather events or political events that alter expected financial performance in the near term.

Rating Process Timeframe

The time required to assign a new credit rating varies and will partly depend on the time required by the issuer, or arranger/sponsor, to respond to information requests from Fitch, along with the time it takes the issuer to review Fitch's draft research for factual errors and the presence of non-public information. Depending on the sector and type of credit analysis involved, Fitch typically assumes a time frame of four to eight weeks to provide a full corporate, financial institution, sovereign or structured finance credit rating.

Rating Withdrawals

Fitch's credit ratings remain its property at all times. As such, Fitch has full discretion to determine if and when to withdraw a credit rating. Fitch can withdraw a credit rating at any time and for any reason and does not withdraw credit ratings simply in response to a request from an issuer.

However, it may be appropriate for Fitch to withdraw the credit rating following such a request if there are other reasons for withdrawal, such as a lack of information, a lack of market interest or regulatory constraints. Some rating withdrawals may be initiated by Fitch's BRM group for commercial reasons. Proposals to withdraw credit ratings are generally subject to review by a rating committee in accordance with Fitch's established procedures, subject to certain exceptions.

It is Fitch's policy in such cases to publish a rating action commentary that includes the credit rating(s) at the point of withdrawal and states that the credit rating(s) has been withdrawn and the rationale for the withdrawal. However, announcements are not issued for credit ratings that relate to obligations that have matured, been redeemed or paid in full.

Criteria Reports

All credit ratings must be assigned according to the applicable criteria. Criteria describe Fitch's assessment of the rating drivers affecting a given sector and the analytical approach and assumptions used to analyze those drivers to assign and maintain credit ratings.

Criteria can be classified as:

- Master criteria that describe the basic foundation for our credit ratings within an asset group;
- Cross-sector criteria that explain Fitch's approach to discrete topics that relate to multiple areas; and
- Sector-specific criteria that describe the rating drivers and assumptions applicable to a particular sector or asset class.

Bespoke criteria may be developed for analysis of individual, or small groups of, transactions or entities. The consistent application of criteria facilitates the comparability of Fitch's credit ratings across regions and sectors. Each criteria report scope specifies the category of obligor, security or instrument to which the criteria can be applied and its geographical reach.

Criteria identify key rating drivers relevant to each rating sector and describe their relative importance to analysis. Criteria reports also include a description of the expected sensitivity of credit ratings to key rating drivers, whether qualitative or quantitative. Where part of the analysis described in a criteria report is implemented using a rating model, the criteria report describes the use of the rating model and all the credit-related assumptions and their value ranges, how the assumptions are applied and the significance of the model outputs.

Criteria reports include an explanation of differences between new ratings analysis and surveillance analysis, if any. Alternatively, when surveillance analysis differs from new issue rating criteria, Fitch may publish surveillance criteria as a standalone report. Such criteria are subject to the same procedures as all other criteria.

Criteria may contain a description of the type and source of the data used to derive the key rating assumptions detailed in the report. For structured finance, this includes those assumptions applied in the portfolio default analysis, portfolio loss analysis and cash flow analysis. For non-structured finance, this includes data used to assign credit ratings, such as accounting statements, data provided by issuers and/or industry data.

Criteria reports describe limitations in the criteria used to assign a credit rating, where applicable, supplementing the limitations included in the [Ratings Definitions](#) section on Fitch's website at www.fitchratings.com.

Fitch's criteria are designed to be used in conjunction with analytical judgment exercised through individual analysts and the 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 underpins Fitch's rating process and assists market participants in understanding the analysis behind our credit ratings.

Criteria Assumptions

The rating analysis applies both qualitative and quantitative assumptions.

Criteria reports specify the quantitative assumptions, or describe the assumption setting process to derive them, applied in credit analysis, including credit-risk-related assumptions contained within models used in the rating process.

Where Fitch's rating analysis applies different quantitative values in the analysis of different credit ratings, criteria may provide a description of the rating-specific assumption-setting process.

Criteria also describe how macroeconomic or other financial data relate to assumptions made in criteria or influence credit ratings, where appropriate. Derivations of specific assumptions by geographical area are provided, where appropriate. Where default and loss assumptions or routine adjustments to externally sourced data, e.g. financial accounting ratios, are used, these are specified in the criteria report.

Quantitative ratios used in the rating analysis are included in the criteria, along with a description of how these ratios relate to each other, such as correlation. Any averages, medians, ranges or measures of dispersion used for key assumptions are described where relevant. Qualitative assumptions are also specified, including the extent to which such assumptions influence rating outcomes.

Developing and Maintaining Criteria

All criteria, including models and assumptions, are reviewed and approved by a Criteria Review Committee (CRC) at least annually and proposals to amend criteria between annual reviews are also required to be approved by a CRC, led by a Criteria Review and Approval Group (CRAG), which is fully independent of the analytical groups.

The CRC evaluates the sufficiency, transparency and rigor of criteria for credit ratings, and any related models used in the rating process. Models are subject to full independent validation once every three years by a Model Validation Group (MVG), with any changes in the interim also subject to review by the MVG. All new and material changes to rating criteria and models must be reviewed and approved by Fitch's board of directors following the CRC's review and approval.

Criteria are developed and maintained by analytical groups and submitted to CRAG for review and approval by CRC. The analytical group will propose amendments to existing criteria where new and significant rating drivers emerge or previous rating drivers or assumptions change. Rationale and rating effect analysis for any proposed changes to criteria are prepared and presented in a CRC.

Criteria are subject to back-testing, which consists of a review of the appropriateness of the criteria considering the historical performance of credit ratings under the criteria, and historical quantitative and qualitative observations relative to criteria assumptions.

Analytical groups are responsible for creating, documenting and updating back-testing analysis. CRCs review the adequacy of back-testing materials during the annual criteria review and approval process, including determining whether the data are sufficiently robust relative to the materiality of the assumptions.

Criteria Change Communication and Application

Exposure drafts must be published for approved proposals that materially change existing rating criteria, including assumptions and models, and for approved proposals for new criteria, models or key rating assumptions, which could have an effect on one or more credit ratings. Exposure drafts for proposed new criteria and any proposed changes to existing criteria, models or key rating assumptions are published on Fitch's website with an invitation to third parties to submit comments.

The exposure draft includes an explanation of the reasons for, and the implications of, the proposed changes, including the anticipated effect on existing credit ratings. During the exposure period, existing criteria continue to be applied to outstanding credit ratings, while new issuer and transaction credit ratings will be assigned using the exposure draft.

After Fitch has assessed the responses, it will publish the results of the consultation and a summary of the content of written responses unless the respondent has requested confidentiality.

Rating criteria will be published on Fitch's website at www.fitchratings.com. Publication of new or revised criteria will be accompanied by a press release describing the changes made, including any effect of the criteria change on outstanding credit ratings.

Following the publication of the new or revised criteria report after an exposure draft, all credit ratings that could incur rating changes as a result of the application of the new or revised criteria will be indicated as Under Criteria Observation (UCO).

However, credit ratings may be placed on Rating Watch where rating implications for relevant credit ratings can be clearly anticipated. The decision to apply Rating Watch instead of UCO is determined by the analytical group. UCO or Rating Watch status will be resolved no later than six months from the publication of the criteria.

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To ensure the quality of its product, a common process for assigning international credit ratings to entities/securities applies globally within all Fitch Ratings offices, irrespective of size or location.

Fitch's Chief Risk Officer (CRO) is organizationally at Fitch Group and; therefore, independent from the analytical groups. The CRO has each of the second lines of defense as direct reports including Fitch's Credit Policy Group (CPG), CRAG and Compliance Group. Together, these groups act to ensure that Fitch's ratings criteria, policies and procedures are consistently executed, that credit ratings are consistent across the company and that it complies with applicable laws and regulations.

CPG is a global, centralized function with a cross-sector mandate to strengthen Fitch's credit analysis, ratings and research by identifying credit risks that require additional focus and ensuring those risks are considered by analytical teams in the ratings process.

A critical component of this mission is continuously soliciting and incorporating external perspectives and information to help CPG more effectively and rigorously challenge Fitch's analytical approach. The group includes the Chief Credit Officer and Group Credit Officers for each asset class.

The Compliance Group identifies and provides advice on compliance risks facing Fitch, conducts testing to ensure management's internal controls achieve compliance with laws, regulations, guidelines and specifications relevant to Fitch's business and monitors employee activity to ensure effectiveness of controls, including those to mitigate conflicts of interest.

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CLOs and Corporate CDOs Rating Criteria

Sector-Specific

Scope

This criteria report details Fitch Ratings' methodology for analysing portfolios of corporate credit for rating collateralised loan obligations (CLOs) and other collateralised debt obligations (CDOs). The report outlines the qualitative and quantitative factors considered in Fitch's analysis of portfolios of corporate credit.

These criteria apply to the rating of combination notes where the underlying tranches are CLOs or corporate CDOs and provide the framework for rating project finance CDOs. The criteria are applicable for new issue ratings and surveillance of existing ratings.

The Fitch Portfolio Credit Model (PCM) is the main tool for analysing the credit risk of project finance credit portfolios. The default probability assumptions and recovery rates are based on asset-specific Credit Opinions and Recovery Ratings (RRs) provided by Fitch's global infrastructure group. Portfolio default rates are based on bespoke correlation assumptions.

Key Rating Drivers

The order of the following Key Rating Drivers for these criteria reflects their relative importance for CLOs and CDOs, for which Asset Credit Quality is the most important.

Asset Credit Quality: Asset quality is a primary driver of the default probability of the underlying corporate assets. Asset quality is based on the corporate Issuer Default Rating (IDR) and term.

Asset Security: Asset security is determined by the seniority of the corporate obligation and includes the jurisdiction of the issuer. Asset security is the main driver of recovery rate assumptions. Average recovery rates, based on historical market data, may be applied in the absence of explicit asset RRs or recovery estimates provided by Fitch's corporate group.

Portfolio Composition: Portfolio performance, in terms of portfolio default rates, depends on the level of diversity by industry and obligor, and geographic concentrations, which determine the expected volatility in portfolio default rates. The key volatility parameter for credit portfolio performance is correlation.

Portfolio Management: Portfolio management and trading may result in an evolving portfolio credit profile, extension risk and other portfolio changes not represented by the closing portfolio. The investment guidelines and permitted management terms are analysed to evaluate the risk factors of a managed portfolio.

Cash Flow Analysis: CLO and CDO structural features and hedging strategies, and the timing of defaults and recoveries, are important considerations in cash flow modelling and have a meaningful impact on their performance.

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This report updates and replaces *CLOs and Corporate CDOs Rating Criteria*, dated 6 April 2022.

Related Research

[Fitch CLO Criteria Assumptions Update Explained \(September 2021\)](#)

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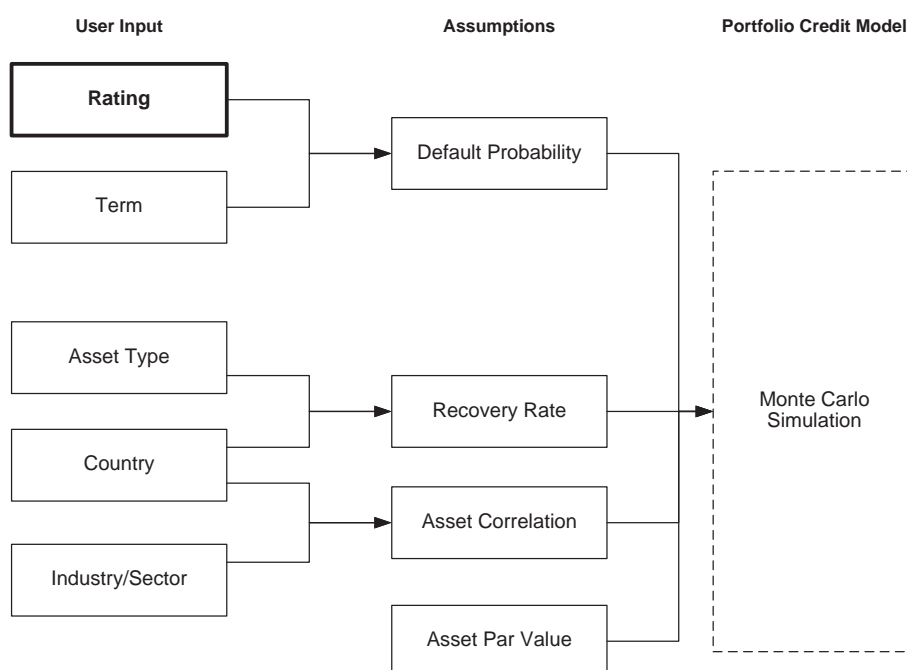
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Quantitative Models and Data

Fitch's main tool in assessing the primary rating factors of corporate CLOs and CDOs is the Fitch PCM, which is available for [download on Fitch's website](#). The model is updated from time to time, and a release log is maintained on the site to indicate the updated features and assumptions. A description of the source data used to derive the assumptions is detailed in each section of this report. Additionally, numbers shown throughout this report may be rounded to the decimal displayed.

Overview of the Portfolio Credit Model Process



Source: Fitch Ratings

The PCM is used for analysing the joint default behaviour within credit portfolios. The model is based on the Gaussian copula function, which is based on the multivariate normal distribution. An important benefit of the Gaussian copula is its analytical tractability. The dependence structure is fully described by the pair-wise linear correlation assumption. For example, zero correlation in the Gaussian copula means all default events are independent.

The two main functions of the model are: mapping generic issuer and asset attributes to corresponding default probability and recovery rate assumptions; and generating portfolio default rate and loss rates for each rating scenario as multiples of the base default rate and loss rate. The key output of the model is the distribution of possible portfolio default rates and loss rates. The base-case default rate is given by the distribution mean, which is equal to average default probability weighted by asset notional amount.

The portfolio performance is uncertain and can deviate significantly from expectations. The volatility of possible portfolio default rates depends on the portfolio composition. Diversified portfolios, in terms of number of obligors, industry or region would be expected to show lower volatility and hence default rates that are closer to the expected case. In contrast, more concentrated portfolios would be expected to exhibit more volatile default rates.

The Gaussian copula only has one volatility parameter, which is correlation. Higher correlation corresponds to more volatile portfolio default rates, which is reflected in a model distribution with fatter tails. In other words, portfolio default rates that are significantly higher than the expected default rate are more likely.

Related Criteria

[Corporates Recovery Ratings and Instrument Ratings Criteria \(April 2021\)](#)

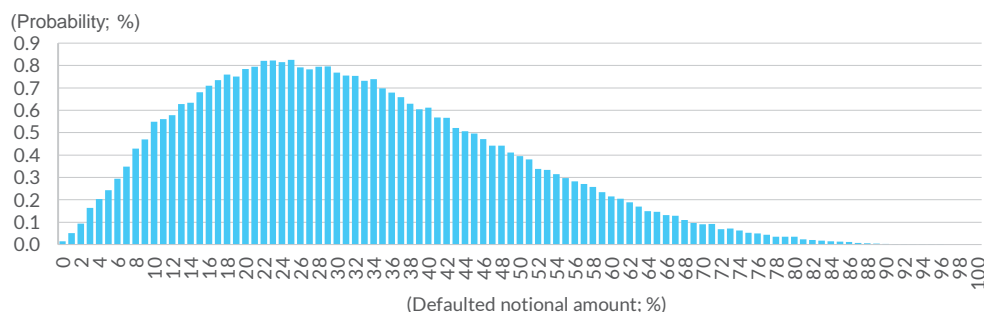
[Global Structured Finance Rating Criteria \(October 2021\)](#)

[Single- and Multi-Name Credit-Linked Notes Rating Criteria \(February 2021\)](#)

[Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria \(September 2021\)](#)

[Structured Finance and Covered Bonds Counterparty Rating Criteria \(July 2022\)](#)

Default Distribution – Probability Mass Function



Source: Fitch Ratings

The portfolio default rate, or rating default rate (RDR), and loss rate, or rating loss rate (RLR), assumptions for each rating level are determined as percentiles of the default and loss distribution. The percentile levels are based on CDO target default rates, as explained below.

Rating Determination

CLO ratings are determined by a rating committee that considers the model-implied rating (MIR) in its determination process.

For newly assigned ratings and upgrades of notes of CLOs continuing to reinvest, MIRs are based on analysis described in the section *Fitch Stressed Portfolio*. The reinvestment status of a CLO is not based solely on whether a CLO has formally reached the end of its reinvestment period; the rating committee considers whether the CLO is likely to continue reinvesting post the end of its reinvestment period, based on the CLO's performance against relevant tests.

For existing ratings not considered for an upgrade, the analysis is based on the actual portfolio.

For static CLOs, and CLOs that are post their reinvestment period and are unlikely to continue reinvesting, the basis for deriving MIRs is described in the section *Static Portfolio Considerations*.

The MIR is a key input to the rating committee determination, although assigned ratings may differ from the MIR in the following situations.

- Note ratings are subject to a rating cap, as defined in the related criteria, and this rating cap is not factored into the MIR. In this case, the note rating will be the lower of the rating cap and the MIR.
- For new ratings and upgrades of existing ratings above the MIR, Fitch can assign a rating higher than the MIR provided that all of the following conditions are met:
 - i. The assigned rating is no more than one notch higher than the MIR;
 - ii. Any excluded cash flow scenarios do not reflect Fitch's immediate expectations; and
 - iii. In the case of replenishing structures, the current portfolio is passing at the assigned rating of the CLO notes.

The foregoing applies to existing CLO transactions subject to refinancing with any material credit negative covenant changes and is applicable to both new and existing ratings, in the case of partial refinancing of the transaction.

- Fitch may assign or maintain a rating on a note at a rating level as much as three notches below the MIR. The occurrence and basis of such decisions may include consideration of the magnitude of the difference between the break-even default rate (BDR) and the hurdle rate at the assigned rating, and the frequency of scenarios in which the BDR exceeds the hurdle rate.
- The rating committee may determine a rating in the range of 'Csf' to 'B-sf' based on Fitch's rating definitions. For example, a 'CCCsf' rating would be assigned if the committee believes there to be a 'real possibility of default', while a 'B-sf' rating would reflect a 'limited margin of safety'. Additionally, a rating committee may assign a new rating of 'B-sf' if (i) the actual or indicative portfolio analysis for the class passes the RDR

Model-Implied Rating

Represents the highest rating at which the note is passing all stress scenarios in the modelling.

at 'Bsf' or (ii) the actual or indicative portfolio analysis for the class, analysed with the transaction minimum and maximum fixed-rate allowance (see *Cash Flow Stresses*), passes the RDR at 'B-sf', to ensure a minimum cushion at the 'B-sf' rating. In such cases, Fitch would typically not perform a stressed portfolio analysis for the 'B-sf' rating level.

For existing ratings, the committee can assign ratings that are different from the MIR if:

- The committee believes there is a significant likelihood that a rating action may be reversed in the near term due to potentially volatile performance; or
- The committee has concerns about specific sectors/issuers that the committee believes are not adequately addressed under the methodology; or
- Certain cash flow scenarios do not reflect Fitch's immediate expectation. For example, in a very low or negative interest rate environment, the scenarios associated with rising interest rates. The assigned ratings cannot be more than three notches higher or lower than the MIR.

Specific examples of deviation from the MIR in surveillance include the following:

- The committee could decide not to upgrade to the MIR if the transaction is exposed to significant concentration risk. The committee would base the decision to assign a different rating from the MIR on sensitivity analysis, which assumes additional stresses for one or more of the largest performing obligors.
- The committee expects near-term asset pre-payments to counter credit deterioration, maintaining the rating above the MIR. The committee would base the rating decision on sensitivity analysis that incorporates, for example, historically observed pre-payment spikes.
- The committee could also assign a different rating from the MIR or change the Rating Outlook or Rating Watch on the basis of sensitivity analysis, which incorporates additional stresses to certain issuers and/or sectors. This may occur if the committee believes these issuers and/or sectors may be subject to near-term performance volatility that is not adequately addressed under the standard recovery and default assumptions.

A deviation from the MIR for new issue ratings or surveillance ratings may include the following:

- The committee may apply a multiplier of less than 100% to various recovery assumptions to align with updated expectations for recovery prospects. This could be precipitated by a drop in the average RR for Fitch-rated securities held in CLOs or by an expectation of below-average recoveries for a specific period. In any case, Fitch will communicate the assumptions in its Rating Action Commentary.

Asset Credit Quality

Asset Default Probabilities

Fitch uses "rating" and "term" as the primary determinants of an asset's expected default probability. There is a substantial history of data related to the default experience of a wide spectrum of corporate entities, rated over four decades. Fitch uses the corporate default rates made available by all three major rating agencies. This data set reflects the broadest set of default statistics available, and minimises the risk of any variances in ratings approach or industry coverage.

The rating is based on the Fitch IDR or Fitch Issuer Default Credit Opinion, together, referred to herein as the Fitch IDR, provided by Fitch's corporate or financial institutions ratings group. In the absence of a Fitch IDR, we may use public ratings from Moody's Corporation or S&P Global Inc. For a detailed description of the Fitch IDR Equivalency Rating derivation, see *Appendix 5*.

Rating Mapping for Mid-Cap Portfolios

Mid-cap borrowers do not have public ratings and it is often not practically feasible to assign Credit Opinions due to the size of the portfolios (100+ companies). This section applies only to borrowers for which no Fitch IDR Equivalency, as outlined in *Appendix 5*, can be established.

In this report, the terms Fitch Issuer Default Rating or Fitch Issuer Default Credit Opinion will be referred to together as the Fitch IDR.

Historical data shows few defaults despite spanning a significant period, making it impossible to infer a default probability based on that data alone.

For bank balance sheet portfolios, the originating bank would typically use a bank internal rating model to assess the borrower's credit risk. The bank may be able to provide a comparison of the bank internal ratings to available agency ratings because it either applies the model to its larger customers or, for internal back-testing, the bank may have run a sample of larger companies with available financial data through its rating model.

For granular portfolios with more than 100 borrowers, where at closing the largest borrower represents less than 1.5% of the portfolio, Fitch may assess the credit quality based on financial ratios and the bank's internal rating tool. We will first determine the average credit quality of the portfolio at a rating category level, which will be no higher than 'BB'. Financial ratios of the borrowers and a rating mapping correlation will both be considered to establish the average credit quality of the securitised portfolio on a rating category basis.

For example, Fitch expects financial ratios such as total debt/EBITDA to be comparable with, or better than, the ones reported in Fitch's *Leveraged Loan Chart Book* for borrowers in the same jurisdiction. We would perform a rating mapping between Fitch, S&P or Moody's and the bank internal rating model, based on the available sample comparison, to distribute the ratings around the established average credit quality of the portfolio.

This rating methodology for mid-cap portfolios will only be used if all conditions below are satisfied:

- Only for bank-originated portfolios where the bank retains a large share on the balance sheet.
- Minimum of five years of historical default history and performance in line with, or better than, the expected performance based on the rating mapping.
- Bank internal rating model subject to regulatory approval, typical for an internal ratings-based approach, for capital relief purposes, and ratings updated frequently, typically within 12 months. Fitch will assess the performance of models by looking at the volatility of rating transition matrices and will analyse the bank's processes to validate its internal rating model.
- Only for portfolios primarily comprising first-lien senior-ranking loans that have been tested through a credit cycle. The securitised portfolios must be broadly in line with the bank balance sheet and be reasonably diverse in terms of number of obligors and obligor exposure.

The surveillance approach for transactions rated under this framework will primarily rely on the rating mapping but the portfolio average rating will be capped at the rating level established at closing. If the correlation between Fitch, S&P or Moody's and the bank internal rating model remains relatively unchanged since closing, and the transaction is performed in line with Fitch's initial expectation, the rating mapping established at closing will be used for the transaction review.

However, if the average credit quality inferred from the initial mapping is higher than at closing then the rating mapping will be adjusted downward so that the average portfolio rating corresponds to the one established at closing.

CDO Target Default Probabilities

Fitch's CDO ratings correspond to a value at risk (VaR) measure, which looks primarily at the probability of exceeding available credit enhancement, the exceedance probability, usually expressed by the level of confidence, and determined as one minus the exceedance probability. For credit risk management under the Basel regulation, the level of confidence is usually chosen to be 99.99%, or 1bp probability of exceeding the VaR. A single confidence level is not sufficient to differentiate between different rating categories. The risk tolerance for each rating level and term is determined by CDO target default rates. The table shows the one- and 10-year CDO target default rates used in the model.

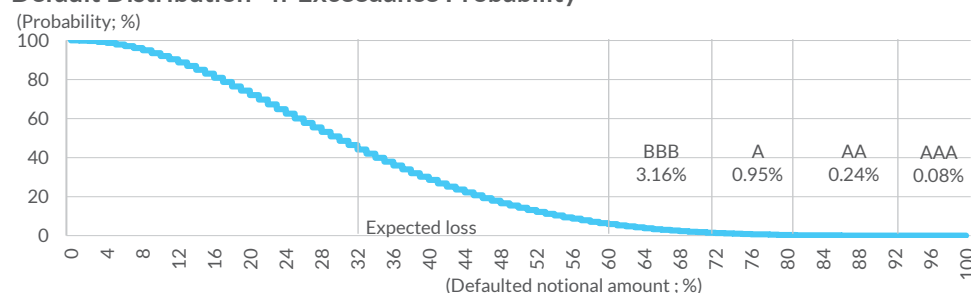
One-Year and 10-Year CDO Target Default Probabilities

	CDO Target DP (%) 1 Year	Confidence Level (%) 1 Year	CDO Target DP (%) 10 Years	Confidence Level (%) 10 Years
AAAsf	0.01	99.99	0.08	99.92
AAsf	0.01	99.99	0.24	99.76
Asf	0.02	99.98	0.95	99.05
BBBsf	0.20	99.80	3.16	96.84
BBsf	1.05	98.95	11.84	88.16
Bsf	3.81	96.19	23.67	76.33

CDO – Collateralised debt obligation. DP – Default Probability
Source: Fitch Ratings

For example, the corresponding CDO rating for a 99.99% confidence level over one year would be 'AAAsf'. In contrast, for a 'BBsf' rating over one year, the target CDO default rate is much higher, yielding a lower confidence level of 98.95%.

Default Distribution - h Exceedance Probability



Source: Fitch Ratings

The chart above illustrates the VaR measure graphically. The curve, which is derived from the portfolio loss distribution, shows the probability of exceeding a certain level of portfolio losses. This allows one to determine the VaR directly from the respective risk tolerance levels or CDO default rates. For credit risk management, the risk horizon is usually one year. CDOs have a much longer risk horizon, of between three and 10 years. Generally, the risk tolerance expressed in the CDO target default rates increases for longer risk horizons. Since the assets in CDO portfolios may have different maturity dates or even amortisation schedules, risk tolerance is determined by the weighted average life (WAL) of the CDO portfolio.

As this applies to the rated notes, Fitch's approach applies target default probabilities equal to the input default probabilities for all rating categories below the 'Asf' category. The approach applies target default probabilities lower than the input default probabilities for the rating categories 'AAAsf', 'AAsf' and 'Asf'. As stated in the prior section, Fitch looks to long-term empirical statistics for its input default probabilities. The sample size of the data cohorts for the 'AAAsf', 'AAsf' and 'Asf' categories contained fewer observations relative to the other observed cohorts. Fitch believes it is prudent to reduce the target default probability and, therefore, raise the confidence level, when determining the level of support necessary to achieve these highest of ratings.

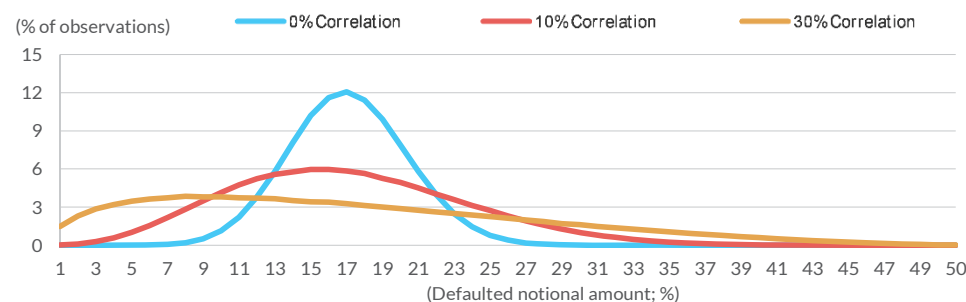
Correlation Framework – Benchmarking to Historical Peak Default Rates

The correlation assumption in PCM is the parameter that determines the volatility of possible portfolio default rates and the resulting multiple of RDRs relative to the base case. The model is able to produce different multiples as a function of portfolio diversity and base case. For example, multiples produced by PCM increase for portfolios that are more concentrated by industry or number of obligors. Similarly, multiples produced by the model decrease as the base case increases.

The chart below shows the effect of correlation on the portfolio default distribution. Fitch has calibrated a correlation framework to match the model-implied volatility of portfolio default rates to the historically observed default rate volatility. More details of the calibration methodology are in *Appendix 3*. We view this as important that the model output can be tied to a fundamental view of credit risk. A primary expectation is CDO notes carrying an investment-

grade rating should perform robustly as a cohort, even in periods of peak corporate default rates. Fitch believes CDO notes rated in the 'Asf' category and above should not default in a stress with similar severity as the recessions that generated the historic peak default rates.

Effect of Portfolio Correlation



Source: Fitch Ratings

This concept of back-testing and benchmarking the model output against multiples of historical default data is an important concept in understanding the rationale for how correlation was set, and has the effect of embedding some explicit and easy-to-understand deterministic overlays onto the simulation-derived results.

Portfolio Default Rate and Model Output Coverage

	BBB (RDR) Peak 9.3%			BB (RDR) Peak 28.8%			B (RDR) Peak 47.9%		
	Peak		30% Single	Peak		30% Single	Peak		30% Single
(%)	Diverse	Portfolio	Industry	Diverse	Portfolio	Industry	Diverse	Portfolio	Industry
AAAsf	16.0	17.3	19.3	37.7	39.7	41.3	56.7	58.7	60.0
AAsf	13.7	14.7	16.0	34.0	35.7	37.0	52.7	54.7	55.7
Asf	11.0	11.7	12.3	29.0	30.3	31.7	47.3	48.7	50.0
BBBsf	8.7	9.0	9.3	24.7	25.3	26.3	41.7	43.0	43.7
BBsf	6.0	6.0	6.0	19.0	19.3	19.7	34.3	35.0	35.3
Bsf	4.3	4.3	4.3	15.3	15.7	15.7	29.7	30.0	30.0
Expected	3.2	3.2	3.2	11.8	11.8	11.8	23.7	23.7	23.7

RDR – Rating Default Rate.

Source: Fitch Ratings

Industry and Regional Diversity

Fitch further believes that credit portfolios that are less diversified, with higher concentrations in terms of industry and region compared with the cohort portfolio underlying the base calibration, could exhibit higher volatility of default rates relative to the base case. The correlation framework was extended to differentiate correlation levels between industries and within a single industry and between regions and within regions. Available historical data was not detailed enough to compute cohort default rates for portfolios with different industry and regional composition. The correlation levels were calibrated to differentiate the RDR between calibration portfolios with higher levels of industry and regional concentration compared with the cohort portfolio (see Appendix 3).

The final correlation framework seeks to differentiate CDO portfolio concentrations that may affect performance. The framework does this through a combination of four correlation adjustments. There is a base level of correlation applied to all assets. The second layer is a sector correlation applied to assets from the same sector. The third layer is an industry correlation applied to assets from the same industry. Finally, the fourth correlation adjustment is applied to the largest obligors in the portfolio to stress for obligor concentrations.

The framework groups industries into six sectors, each containing one to nine industries. The example in the *Correlation Framework* table refers to a US portfolio. The base level of correlation is set to 6%, with a 2% correlation and a total correlation of 8% between assets in the same sector. If assets are also in the same industry class within a sector, the correlation is assumed to

be even higher, set at 28%. The deepest empirical data set on defaults is available only for the US and, therefore, not representative of multi-country diversity. However, Fitch believes there is a significant level of regional diversification within the US.

In order to vary correlation assumptions to reflect geographic diversity or concentration, Fitch began with the following guiding principles:

- Advanced-economy countries smaller than the US would not benefit from the same level of regional diversification. Therefore, the base correlation between companies in countries other than the US should be higher than the 6% US assumption.
- The global economy results in a relatively limited benefit within a region. For example, a portfolio diversified within western Europe should not yield materially different portfolio default rates than a US portfolio.
- Different industries benefit from geographic diversification to varying degrees.

With these guiding principles, the correlation framework is applied, with a base level of correlation for issuers located in different regions, with add-ons for commonality of country, sector and industry.

Correlation Framework

(%)	Base Level ^{ab}	Sector Add-On	Industry Add-On (%)
Same Country	10 (6 if US)	+2	+20
Same Region, Different Countries	6	+2	+20
Different Regions	4	+2	+20
Banking and Finance Assets	As above	+14	8

^a Includes global base of 4% plus regional uplift of 2% and country uplift of 4% (except US where country uplift is 0%).

Note: For a full list of countries and industries in the portfolio credit model, see *Appendix 3*.

^b Except Greece, which has a country uplift of 5% and; therefore, a base level correlation of 11%.

Source: Fitch Ratings

Sovereign-Related Risk

Transactions may have partial exposures to countries where the Country Ceiling is below the highest rating of the notes and/or where Fitch applies a cap to its structured finance ratings, pursuant to the [Structured Finance and Covered Bonds Country Risk Rating Criteria](#). Currently, this is the case for the Fitch-rated high-yield CLOs with exposure to peripheral Eurozone countries, such as Italy, Portugal and Greece, which follows the *Structured Finance and Covered Bonds Country Risk Rating Criteria*.

The updated correlation and recovery assumptions would be calibrated to match the expected loss at the country rating cap level to the 'AAAs' level. The Country Ceiling for these countries is currently below the highest rating Fitch can assign to the senior notes in high-yield CLOs. Therefore, in line with the *Structured Finance and Covered Bonds Country Risk Rating Criteria*, we assume a possible exit of these countries from the Euro in rating scenarios above the Country Ceiling. This would cause, at the very least, significant performance volatility for underlying borrowers, currency transfer and convertibility (T&C) issues and FX risk for any proceeds from outstanding loans.

Fitch believes the borrowers would likely default in such a scenario and as a result the T&C and FX risk following a Euro exit would primarily apply to any recovery proceeds. We apply a haircut to the recovery proceeds of 50% to assets from these countries at rating levels above the relevant Country Ceiling in order to address the possible FX risk that could result from the depreciation of a new currency following redenomination of loans.

For example, for a European CLO with a 20% investment limit in countries with a Country Ceiling below 'AAA', or a sovereign rating below 'A-', the usual projected default rate for the 'AAAs' scenarios is about 60%. This would be assumed to include a 20% exposure to Italy, which is currently the only country with a Country Ceiling below 'AAA' with significant volumes of outstanding leveraged loans. The remaining 40% of defaults would be spread across other countries, which is consistent with Fitch's typical 'AAAs' default expectations for portfolios not

exposed to countries with a Country Ceiling below the target rating. The total default rate assumption would remain unchanged in this instance.

The expected recovery rate at a 'AAAsf' rating for the 20% exposure bucket would be reduced by 50% assuming a depreciation of the new currency to the Euro. As a result, the aggregate recovery assumption for a 'AAAsf' rating scenario for a typical second-generation CLO would decline to 29% from about 35%. The haircut for T&C and FX risk and additional stresses to correlation or recoveries are not included in the PCM model analysis and need to be applied separately to the model results.

However, European CLOs are generally precluded from investing in large exposures to countries with a Country Ceiling lower than 'AAA'. Fitch considers the redenomination risk and country risk in second-generation European CLOs with the typical limit of 10% or lower a secondary risk. For example, the 'AAA' recovery rate would go down to 32% from 35%, with a minimal effect on the BDRs. Therefore, we would not apply any additional stresses during the rating process for a typical European CLO. This may change as the Country Ceilings, the loan market (more issuance from new countries) or the CLO limitations change.

Additional stresses contemplated in the [Structured Finance and Covered Bonds Country Risk Rating Criteria](#) are generally not applied during the rating process for typical US CLOs, which are generally precluded from investing in companies domiciled in peripheral eurozone countries. Therefore, T&C risk would not be considered a risk factor in these instances.

Emerging Markets

The correlation framework within PCM was further developed to incorporate assets from emerging market (EM) countries and reflect the following additional expectations. Corporate credit portfolios in EM countries are likely to have more volatile portfolio default rates, indicating a higher level of correlation than similarly rated portfolios in advanced economies, regardless of region and country. Therefore, the criteria apply a 7% uplift to the correlation of any two EM assets.

Regional diversity is particularly important for portfolio performance within EMs and, as a result, EM assets from the same region are subject to an additional 10% correlation uplift. Fitch created four broad EM regions to implement this: EM Americas, EM Asia, EM Europe and Central Asia, and EM Africa and the Middle East. Country diversity within the same region is of lesser benefit than regional diversity and assets from the same country are subject to an additional 5% correlation uplift. The same approach with regard to industry concentration apply to EM and advanced economies.

Fitch believes a small amount of EM exposure in a well-diversified portfolio of debt from advanced economies should add geographical diversity and reduce volatility. However, it is our view large EM exposures increase the risk to the portfolio, especially in high rating scenarios, and this outweighs any diversity benefits. By way of illustration, the correlation between Russian assets in different sectors is 26%. This is made up from the sum of 4% global base correlation, 7% EM base correlation, 10% EM region correlation and 5% EM country correlation. By comparison, the correlation between US companies would be 6%, or 4% global base and 2% for being in the same region.

EM Geographical Correlation Framework

Location	Location				
	Global Base Level	EM Base Add-On	EM Region Add-On	EM Country Add-On	Total EM Add-On
(%)					
Same EM Country	+4	+7	+10	+5	+26
Same EM Region and Different EM Countries	+4	+7	+10	+0	+21
Different EM Regions	+4	+7	+0	+0	+11

EM – Emerging market. Note: Fitch would also apply sector and industry correlation uplifts of 2% and 20%, respectively, in line with the advanced economy table above.

Source: Fitch Ratings

If the Russian assets are also in the same industry, they will attract a further uplift up to 22%, which would give a total correlation for such a portfolio of 48%. For EM assets from different geographical regions and sectors, for example, a Russian utilities company and an Indonesian finance company, the correlation will be 11%, i.e. 4% global base plus 7% EM base.

Transactions with a material share of EM assets with high regional concentration are unlikely to support 'AAA'sf' ratings, especially if many of the assets are from low-rated sovereigns. Such concentrated structures, and single-country EM transactions, will be subject to specific rating caps as listed in our [Structured Finance and Covered Bonds Country Risk Rating Criteria](#). The correlation framework may be adjusted through a criteria variation to further reflect any specific risks or protections related to the underlying portfolio. A similar approach will be used for transactions where ratings are only assigned on a national scale, where the correlation framework will also be amended to reflect the particularities of the relevant jurisdiction.

Asset Security

Observations from the high-yield default period in 2009 highlighted the pro-cyclical nature of defaults and recoveries, with lower recoveries occurring during periods of higher defaults. Fitch incorporates pro-cyclicality by applying lower recovery for higher rating scenarios. For defaulted securities, we may also consider the post-default trading prices and any feedback received from the manager, when deciding the applicable recovery assumptions.

Corporate Recovery Ratings

RRs and recovery estimate values provided by Fitch's corporate ratings group are a good indicator of future average recovery prospects for typical CLO portfolios on a diverse portfolio basis, across multiple cycles. Absent asset-specific RRs issued by Fitch, fundamental characteristics, such as seniority level, security, jurisdiction, issuer and industry idiosyncratic characteristics, are the main drivers of recoveries.

Fitch's RRs scale provides market participants with additional recovery information for all entities whose IDR is 'B+' and below. RRs range from 'RR1', which indicates an outstanding level of recovery, to 'RR6', which reflects a poor recovery. Fitch's RRs largely represent ultimate recoveries following the work-out process. In addition to RRs, our corporate ratings group may also conduct a bespoke analysis indicating specific recovery estimate values that may be used in our analysis of a typical diverse portfolio CDO. More information on Fitch RRs is available in our [Corporates Recovery Ratings and Instrument Ratings Criteria](#).

Seniority

In the absence of asset-specific RRs or recovery estimates, Fitch generally looks to the seniority and security of the actual debt instrument as its primary indicator for the recovery prospects in its analysis of a CDO portfolio. Fitch will assign a recovery rate category corresponding to our view on the asset's recovery prospects, if asset-specific recovery rate assumptions from Fitch's corporate credit analysts are not available.

The categories describing the relative recovery prospects are included in *Appendix 4*. Categorisation will primarily be based on the seniority of the actual debt instrument, with senior secured loans generally corresponding to "strong recovery prospects" and senior unsecured bonds corresponding to "moderate recovery prospects". Senior secured bonds correspond to their named category, which is equal to an RR of 'RR3'; this is due to lower historical observed recovery rates for bonds compared with senior secured loans. Other debt instruments, including second-lien loans, will commonly be categorised as having weak recovery prospects.

However, where actual recovery experience is less than might be expected for the level of seniority, a lower categorisation may be used in specific cases. For example, for Japan the recovery rate for senior unsecured debt has been below 'moderate' recovery rates. As a result, Fitch would apply a 'weak' recovery rate for senior unsecured debt in Japan.

Furthermore, seniority and security do not fully explain Fitch's recovery expectations for any given asset. The distribution of current US corporate RRs by seniority shows wide variance in the recovery expectations as this may be due to issuer-, industry- or market-related factors. Issuer-specific factors include financing decisions on optimal capital structures by management.

Other factors may affect the recovery prospects for particular companies operating in specific industries.

From time to time, there may be macro-factors affecting the types of debt instruments available to issuers. There were limited financing options in 2009-2010, resulting in many companies issuing senior secured bonds to refinance existing loan facilities. The future recovery prospects for these bonds will likely vary, based on the security and covenant protections associated with the debt instrument.

Therefore, the portfolio composition and associated recovery prospects of the underlying assets are reviewed by the relevant credit analyst as part of the CDO rating process. Fitch will make adjustments to the recovery category classification to reflect our forward-looking view on the recovery prospects for each asset in the portfolio, if deemed necessary.

Jurisdictional Considerations

Another important determinant of recovery prospects is jurisdiction. Fitch determined country groupings, based on comparable levels of expected recoveries. Obligors from Group 1 countries, see the *Corporate Recovery Rate Assumptions* table and Appendix 4, are mostly expected to exhibit recovery prospects consistent with those of US obligors, while Group 2 and Group 3 are expected to exhibit decreasing levels of recovery. A full list of Fitch's base recovery assumptions and the tiering applied at different CDO rating stresses can be found in Appendix 4. Finally, Fitch may use additional information, such as the notching differential between the instrument rating and IDR, to better inform its decision on the recovery assumption for any given asset.

Pro-Cyclical Nature of Defaults and Recoveries

Fitch's default and recovery studies show that, while the average recovery for a given seniority has been very variable over time, the relationship of recoveries by seniority generally holds true over time. Market-wide systemic factors play a role in the well-established inverse relationship between default rates and recovery rates, whereby low recovery rates are associated with high default rates.

Fitch stresses the recovery rate assumptions in higher rating stresses to account for the pro-cyclical nature of defaults and recoveries. Recovery observations from the most recent peak default period were more in line with the modelling assumptions used at high rating stresses. As stated earlier in this report, Fitch believes CDO notes rated in the 'Asf' category and above should still be expected to perform in periods of peak default rates. For this reason, the recovery assumptions for 'Asf' stresses are set to match observed recoveries from peak default periods during the three years starting in 2008 for the financial crisis.

Obligor Concentrations

Portfolios with a small number of assets, or those where individual asset balances represent a disproportionate exposure within the portfolio, carry the risk the portfolio performance may be adversely impacted by a few assets that may under-perform expectations based on ratings and debt characteristics. Fitch's methodology applies additional stresses, called the obligor concentration uplift (OCU), to certain inputs to mitigate the risk to CDO portfolio performance posed by outsized assets.

For example, individual assets may recover less upon default than expected based on historical average recovery rates for individual debt classes. Outsized individual assets experiencing low recoveries will cause them to erode a disproportionate amount of support available to rated noteholders. To take this into account, Fitch applies a 0.75 multiple (i.e. 25% haircut) to the assumed recovery rate of the largest risk contributors. This stress is applied within the model framework to standard recovery assumptions or assets with RRs, and has an effect on the portfolio loss distribution. The stress is not applied to asset-specific recovery estimates, which are assigned to individual assets but it is applicable to assets with RRs.

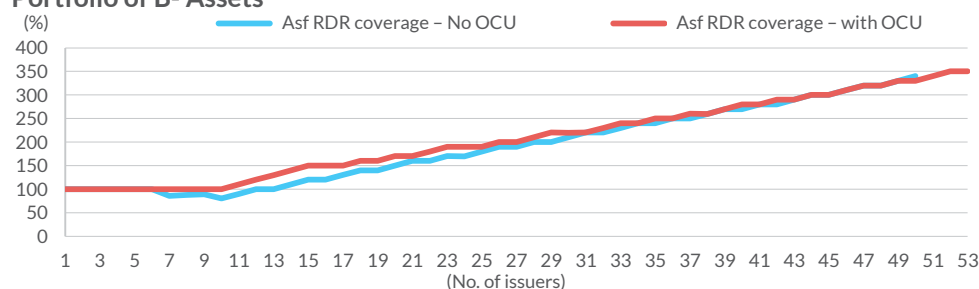
While the risk, with respect to recovery rates, is relatively apparent, the obligor coverage produced by the methodology is a function of the correlation assumptions and much less straightforward. Similar industry and geographic diversity portfolios with a larger number of obligors are expected to be subject to lower volatility in terms of default rates. The PCM model framework is already sensitive to obligor concentrations in that the rating default-rate increases as portfolios contain fewer assets.

Furthermore, the CDO target default probabilities are the same as, or lower than, the input default probabilities. Accordingly, the RDR for each liability rating level covers at least the largest obligor with a lower rating and a term equal to, or longer than, the WAL of the portfolio. This approach creates what can be thought of as a floor in the assumed default rate, such that there is protection in the event the larger assets default. This is particularly important where the portfolio credit quality is relatively high, and individual assets can represent a large proportion of the support available to a particular class of rated notes.

The joint coverage of several of the largest obligors is a function of the correlation assumption. In order to address the idiosyncratic risk with respect to the default behaviour of the largest obligors, Fitch applies a correlation stress of 50% to the largest risk contributors. The largest risk contributors are determined based on the notional size of individual issuers in the portfolio. The stresses are applied to the largest issuers up to a maximum of 15 for which the aggregate notional size is in excess of 30% or any individual issuer that is at least 6.5% of the portfolio notional size.

For example, for an equally weighted portfolio of 15 issuers the stress would be applied to all 15 issuers, as each is 6.7%. On the other hand, no stress would be applied if the largest 10 issuers represent 20% or less of the portfolio notional size, as the largest 15 would have to be 30% or less. The methodology seeks to address coverage of the largest risk contributors. For example, the chart below shows the 'Asf' RDR covers at least the largest 10 'B-' issuers.

Asf RDR Coverage of the Largest 10 Issuers for Equally Weighted Portfolio of B- Assets



RDR – Rating Default Rate. OCU – Obligor concentration uplift.
Source: Fitch Ratings

Excessive Obligor Concentration

The correlation and recovery stresses outlined above address the idiosyncratic risk, with regards to larger obligors, in reasonably diverse portfolios. It is theoretically possible to have a 'AAAsf' rating on a portfolio with only a few loans, albeit with very high credit enhancement. Even if the loans may be assumed to default, the methodology still assumes recovery proceeds at the 'AAAsf' stress level.

In Fitch's view, however, such excessive obligor concentration bears too much idiosyncratic risk, with regards to achievable recovery rates, and we would not assign high investment-grade ratings. For example, Fitch would not assign a new rating or upgrade an existing rating higher than 'BBBs' for a portfolio with fewer than 10 obligors, all rated 'B'.

Fitch analyses the potential for excessive obligor concentrations throughout the duration of the transaction, which may become more concentrated at the end of their lives as a result of unexpected default or pre-payment behaviour. We would apply the principles above but a committee may decide not to downgrade a rating if, for example, there are other mitigating factors such as short remaining life for the notes or performance history of the transaction.

Portfolio Management

Transactions may be static or managed. Fitch considers there may be additional risk in managed transactions, given that the portfolio may deteriorate not only by natural credit migration but also by substitution of assets during the revolving period. Available credit enhancement may be affected by realised gains or losses that result from trades, and from defaults and amortisation.

When analysing transactions that include portfolio covenants and eligibility criteria in their documentation, Fitch will consider all covenants and all aspects of the management guidelines, including asset eligibility criteria and the manager's ability to:

- Substitute assets freely or subject to defined covenants;
- Substitute impaired credits freely or not;
- Withdraw or monetise "surplus" credit enhancement; and
- Obtain quotes or trade with dealers other than the arranging bank.

Actively managed portfolios are initially rated based on a Fitch stressed portfolio created based on the terms and conditions in the transaction documents. We maintain our ratings on actively managed portfolios by monitoring the performance and credit profile of the actual portfolio relative to the initial stressed portfolio analysis. In instances where there is limited or no portfolio management, Fitch maintains ratings based on the analysis of the static portfolio of identified assets.

Fitch Stressed Portfolio

In its analysis of transactions with managed portfolios, Fitch analyses stressed-case portfolios with the aim of testing robustness of the transaction structure against its covenants and portfolio guidelines. Typically for US CLOs, we start with the initial indicative portfolio provided by the arranger and then make adjustments to account for certain concentration limitations. This is completed with the CLO-Fitch Stressed Portfolio Model. The indicative portfolio provides a good gauge of assets the portfolio manager is likely to purchase, at least for US CLOs with a broader universe of leveraged loans.

In the case of most European CLOs, Fitch uses a standardised stress portfolio that is customised to the specific portfolio limits for each transaction as specified in the transaction documents. European CLOs tend to have a high overlap in terms of issuers and loans, due to the limited universe of eligible assets. As a result, managers have significantly less choice in the portfolio selection for European CLOs compared with US CLOs backed by BSL or middle market loans.

The following are the most common adjustments applied to the indicative portfolio for typical CLOs. The same principals are also reflected in the standard stress portfolio in the case of European CLOs. This list is not exhaustive, as some CLOs may allow for limited exposure to certain asset types or other risk factors that Fitch may choose to stress in its analysis. The Fitch stressed portfolio will be determined in Fitch's committee process.

We will consider the expected ability of the manager to create a portfolio at the limit of its covenants. The absolute limit of some covenants may not be achievable in reality. An example would be the absence of a covenanted country concentration limit in a European CLO, where historically no portfolio had more than 35% exposure per country. In such cases, we will create a stressed-case portfolio with less than 100% single-country concentration, despite the lack of a country limit.

Obligor Size

A typical CLO will cap the size of obligors, with an allowance that a specified number may be a larger percent. We assume managed portfolios are generally managed toward permitted concentration limitations that can lead to increased portfolio concentration. This may lead to more volatile portfolio performance, resulting in higher default expectations under high investment-grade rating stresses.

With regard to obligor size, the stress portfolio is constructed to include obligors that match the maximum limits. For instance, the indenture may specify each obligor to be 2.0% of the portfolio, with the exception that up to five obligors may each be up to 2.5%. In this instance, the Fitch stressed portfolio assumes these exceptions are maximised, with the top five obligors concentrated to represent 12.5% of the portfolio.

Portfolio Credit Quality

Fitch stresses credit quality of the portfolio by increasing exposure to assets in the 'CCC' category, or worse, based on the proportion permitted by the concentration limits, except for transactions that covenant to a Fitch weighted average rating factor (WARF), as defined below. For BSL CLOs, for example, the limit is set relatively low and Fitch would maximise the permitted amount or, if the indicative portfolio already exceeds the permitted 'CCC' allowance when mapping to our ratings, such proportion would be maintained.

Typically, limitations for assets rated in the 'CCC' category, or worse, are calculated based upon the then-current rating of assets. Where the definition of the limitation of 'CCC' category or lower-rated collateral varies from this, Fitch may apply additional stresses to the credit quality of the portfolio, which would be described in our rating report. If the transaction structure also includes a collateral quality test based on the Fitch WARF, then credit quality of the stressed portfolio is matched to the covenanted test level and exposure to 'CCC' category or lower-rated assets may not be assumed at the limit. This stressed assumption increases the portfolio default probability assumptions in PCM.

Assets without a Fitch rating or Credit Opinion and without a public rating from another agency would be considered 'CCC', as explained in *Appendix 5*. However, for the purpose of calculating the WARF test, the manager may treat such assets as 'B-' if the Fitch derived rating based on private ratings provided by Moody's and/or S&P (for the avoidance of doubt, this means full ratings only and does not include Credit Opinions) is higher than 'CCC'. While private ratings are available to managers they are not available to Fitch. Therefore, we would apply an additional stress if the exposure to such assets could exceed the typical limit of 10% of the portfolio notional amount. Fitch would expect that the use of this bucket is included in the regular transaction reporting.

Asset Security

A typical CLO allows for some portion of the portfolio to be invested in assets that are not senior secured loans, this could be second-lien loans or other instruments that have historically experienced low recoveries. Fitch's stressed portfolio analysis assumes the maximum allowance for non-first-lien collateral. For such assets our recovery assumptions would be zero in high investment-grade scenarios. Assets that are not senior secured loans are assumed to have weak recovery prospects. For portfolios of senior secured loans we assume the stress portfolio has similar seniority and recovery characteristics as the indicative portfolio provided and use RRs or recovery estimates where available.

If the transaction structure includes a collateral quality test based on the Fitch weighted average recovery rate (WARR), recovery assumption of the stressed portfolio is matched to the covenanted test level. The initial covenanted WARR is typically set below the weighted average recovery of the indicative portfolio, giving managers flexibility to buy assets with weaker recovery prospects.

Where a WARR is included, a homogenous portfolio distributed around the WARR is usually more conservative than a barbell portfolio including the maximum allowance of non-first-lien collateral. We would base the rating recovery rate (RRR) on the Interpolation Grid in *Appendix 10*, which is based on a typical portfolio without barbell seniority distribution.

Industry Concentration

CLOs typically have limitations on exposure to any one industry, with exceptions for a certain number of industries to exceed this limit. For instance, the indenture may specify each industry is limited to 10% of the portfolio, except three industries may be 12% and one may be 15%. The stressed portfolio is typically created maximising the permitted exposure to the three largest permitted industries. If industry limits are exceeded based on our view of the portfolio industry composition in the indicative portfolio, the stressed portfolio would maintain the same industry exposure for the outsized industries.

Risk Horizon

Managed CLOs have a defined reinvestment period that often extends the WAL of the CLO notes beyond the WAL of the initial indicative portfolio. The manager can usually reinvest between payment dates and continue to reinvest on a maintain or improve basis, even if portfolio profile tests in the transaction documents are not met. In Fitch's stressed portfolio analysis, the WAL of the assets is extended to match the WAL permitted by the terms of the CLO transaction documents to address the additional default risk inherent with a longer risk horizon.

This stressed assumption increases the portfolio default probability assumptions in PCM. The stressed portfolio analysis WAL may be reduced by up to 12 months, in no case reducing the WAL of assets below six years or the WAL of the indicative portfolio, to account for structural and reinvestment conditions prevalent in a CLO post-reinvestment period. This ultimately reduces the maximum possible risk horizon of the portfolio when combined with loan prepayment expectations.

Cash Flow Stresses

Certain covenants and portfolio guidelines may allow for exposures that Fitch may stress in its cash flow analysis. For instance, if the transaction allows for some portion of the portfolio to be invested in fixed-rate assets, we will analyse the effect of this allowance being maximised. In a rising interest rate environment, fixed-rate assets could be a negative drag on interest proceeds available to notes. Fitch stresses the portfolio weighted average spread (WAS) and weighted average coupon (WAC) to the minimum level specified by collateral quality tests. These stressed assumptions limit the amount of credit applied for excess spread and influence BDR analysis (see *Cash Flow Analysis*).

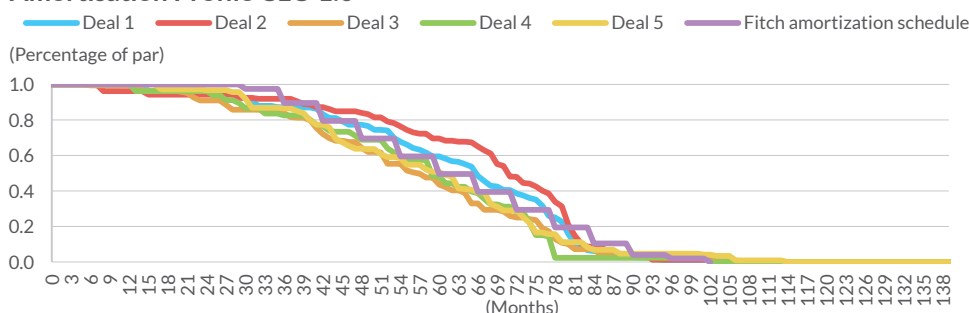
We analyse the potential risk of cash flow timing mismatches associated with allowances for assets that pay less frequently than quarterly, in a quarterly pay transaction, if no structural mitigations are present, such as interest smoothing accounts or a frequency switch mechanism. The latter are standard in European CLOs. The potential is maximised for these types of exposures and assumes 75% of assets pay in quarters one and three and 25% of assets pay in quarters two and four.

Asset Repayment Assumptions

In modelling CLO note amortisation we generate an assumed principal payment schedule. We use the actual maturity profile of the identified portfolio assets as a proxy for the expected portfolio repayment profile as the CLO enters the note amortisation period. In the stress portfolio analysis, the WAL of the assets is extended to match the risk horizon of the CLO as specified in the *Risk Horizon* section above.

For European CLOs, Fitch uses a standardised amortisation profile together with a standardised stress portfolio. European CLOs tend to have a high overlap in terms of issuers and loans, due to the limited universe of eligible assets. As a result, managers have significantly less choice in terms of portfolio selection for European CLOs compared with US CLOs.

Amortisation Profile CLO 1.0



Source: Fitch Ratings

Portfolio Trading Limitations

Limitations on portfolio trading are expected in managed CLO structures. Typically, these triggers are based on collateral quality tests established at the onset of the transaction. If the performance of the actual portfolio significantly deteriorates, such that certain collateral quality tests fail, then the trading activity is expected to either maintain or improve the pre-trade test levels.

Fitch portfolio metrics normally include a Fitch WARF Test and a Fitch WARR Test. Typically, these two tests, along with the Minimum WAS Test, form the basis for dynamic portfolio management, via a Fitch Test Matrix. The calculations for a Fitch WARF and Fitch WARR are included in Appendix 6. Alternatively, trading metrics may also reference outputs from Fitch's PCM. Our analysis of notes issued by a CLO that incorporates PCM outputs into portfolio management limitations will be based upon analysis testing the robustness of the structure against such PCM outputs assuming a portfolio that corresponds to the PCM output limitations defined by the transaction documents.

To analyse the Fitch Test Matrix, Fitch creates a stress portfolio for one WARF in the matrix, which is then used to linearly extrapolate the default assumption for the other Matrix WARFs. A one-point increase in the WARF corresponds to an approximately 1% increase in RDR at all rating levels. This relationship between WARF and RDR holds for typical CLO portfolios with WARF in the range between 20 and 35. The WARF range may increase to 40 for transactions with a higher limitation for assets rated in the 'CCC' category or worse.

Fitch may create bespoke stress portfolios for each WARF outside of this range. Since test matrices often include several thousand different WARR points, we interpolate recovery rates for each rating level based on the WARR and asset-specific recovery assumptions, as shown in Appendices 4 and 10. We aim to analyse all different combinations of WARF, WAS and WARR in the matrix. However, arrangers may specify highly granular matrices with incremental increases in the WAS of less than 20bps. In these cases, Fitch will analyse a grid of rows with WAS increments of at least 20bps.

These tests are typical for Fitch-rated European CLOs and US middle market CLOs, as the analysis primarily relies on ratings and Credit Opinions provided by Fitch's corporate group. These tests may not be present in US BSL CLOs, where other collateral quality tests are present and another agency assigns ratings to notes with subordinated priority to the Fitch analysed notes. In instances without specific Fitch tests, we will consider collateral quality tests included in transaction documentation when building a stressed portfolio. However, when assigning ratings to classes of notes subordinate to notes rated by other rating agencies, we will rely upon the Fitch specific collateral quality limits indicated in the transaction documents when creating the stressed portfolio.

Static Portfolio Considerations

New ratings for CLO notes backed by static portfolios are assigned based upon a scenario that assumes a one-notch downgrade on the Fitch IDR Equivalency Rating for assets with a Negative Outlook on the driving rating of the obligor. Rating reviews for notes issued by static CLOs and CLOs no longer likely to reinvest apply these same assumptions when an upgrade of a note is considered. Rating reviews considering an affirmation or downgrade of a note from these types of CLOs do not assume the one-notch downgrade on the Fitch IDR Equivalency Rating for assets with a Negative Outlook. This analysis is generally not applicable for CLOs with a remaining reinvestment period as the Fitch stressed portfolio analysis is more constraining than results using this assumption. All MIRs are based upon the relevant portfolio described in this section.

Operational Risk Considerations

Operational risk considerations for a managed portfolio apply equally to substitution agents, portfolio advisors, liquidation agents and other parties that perform manager functions. Parties performing manager functions must establish they have sufficient experience, systems and procedures and can reasonably be expected to manage the CLO in compliance with the transaction documents to be viewed as acceptable.

Fitch will not rate transactions managed by parties that are not viewed as acceptable, unless there are other mitigants, such as a back-up manager. Fitch may consider a manager to be unacceptable if it believes the CLO covenants cannot be relied upon due to lack of experience by the manager or other operational concerns. The initial operational risk assessment review covers the manager's company, controls, investments, operations and technology, as described in Appendix 9.

Fitch will update its assessment of managers when assigning ratings to new transactions if any of the following are materially changed since its last assessment of such manager:

- Ownership structure;
- Key employee departure;
- Regulatory actions or criminal/civil actions levied against firm or employees; and
- External audit or regulatory exam findings.

Organisations may undergo multiple operational reviews or updates to assessments if they maintain multiple business lines that issue corporate CDOs, such as US BSL CLOs, US middle market CLOs and European CLOs, as each business line may have different operations, technology, etc. In the event a manager is being replaced in a transaction, Fitch needs to be notified of the proposed change and will review the successor manager. We may decide to withdraw or downgrade the ratings if the new parties are not viewed as acceptable to manage a Fitch-rated CDO or CLO.

Cash Flow Analysis

To determine the rating of a given tranche of notes, we analyse a series of stress scenarios to determine whether the payment of interest and principal according to the terms and conditions of such notes is fulfilled across all scenarios. In our rating reports, we discuss the indications given by cash flow model runs in the scenarios summarised in the table below, and the related rating considerations.

Fitch uses either the Global CLO Cash Flow Model or: (i) the CLO/CDO of ABS Cash Flow Model for US BSL and middle market CLOs; or (ii) the Multi-Asset Cash Flow Model for non-US CLOs. Cash flow model analysis in this report refers to the use of one these two models, as applicable in the context. While the cash flow model analysis is an important consideration in determining the final rating, ratings are ultimately assigned by a Fitch rating committee that also considers other quantitative and qualitative factors.

BDRs are an output of Fitch's cash flow model that show the maximum portfolio default rates a class of notes can withstand in stress scenarios without experiencing a loss. BDRs for a class are then compared with PCM RDRs (hurdle rates) at the corresponding rating stress. The 'Bsf' rating stress is used as the 'CCCsf' input to the cash flow model. The committee considers the BDR compared with the hurdle rate as the key quantitative factor for assigning a rating.

The table below shows the standard scenarios Fitch runs for a corporate CLO in the absence of FX risk. These would be run to determine the model implied rating. Committees may assign ratings different to the MIR, see Rating Determination above, if, among other reasons, one or more of these scenarios do not reflect the committees' near-term expectation.

Summary of Standard Scenarios

Default Distribution	Interest Rate Trend
Front-Loaded	Rising
	Stable
	Decreasing
Middle-Loaded	Rising
	Stable
	Decreasing
Back-Loaded	Rising
	Stable
	Decreasing

Source: Fitch Ratings

Fitch's approach to cash flow modelling is based around determining whether a class of notes pays according to its terms, under a series of defined interest rate and default timing stress scenarios for a given rating level. If a particular class of notes has received payment in full in a given stress scenario, it is deemed to have passed that stress scenario.

Based on the outputs of PCM and the defined stress scenarios, Fitch's cash flow analysis determines whether the CDO liabilities receive principal and interest in accordance with the terms of the transaction documents. Fitch analysis uses a proprietary Excel-based cash flow model, customised for rating-relevant structural features for each transaction, based on information and transaction documents provided to us by the issuer, originator, or third-party agents on their behalf. Our cash flow model is not publicly available.

Each transaction's customised cash flow model accounts for the CDO's capital structure and unique structural features, including but not limited to:

- The interest and principal priority of payments, including provisions for various fees and expenses based upon a 30-day month convention;
- Coverage tests (e.g. overcollateralisation tests, interest coverage tests, reinvestment overcollateralisation tests);
- Any interest rate or currency swaps or hedges; and
- Other relevant structural features.

Timing of Defaults

Fitch uses different default timing scenarios to assess the ability of the structure to withstand various clusters of defaults. Our default timing scenarios apply peak defaults over a two-year period, which is consistent with research on historical default patterns. We will test the structure for front-, middle- and back-loaded peak default scenarios. The total amount of defaults will always be the same for each default timing stress.

The timing of the default peak is adjusted according to the portfolio's WAL, see Appendix 7 for default timings for portfolios with a WAL from 0.5 years to 10 years and above. As an example, the default timings used for a portfolio with a WAL from 7.875 years, up to, but not including, 8.125 years is as set out in the table below.

Default Timing for Rounded^a WAL of Eight Years (% Share of RDR)

Year	Front	Mid	Back
1	33.5	7.0	—
2	22.5	7.25	10.0
3	8.0	8.0	12.5
4	8.0	22.5	12.5
5	8.0	33.5	12.5
6	8.0	7.5	12.5
7	8.0	7.25	20.0
8	4.0	7.0	20.0

^a Rounded to the nearest 0.25 years. RDR – Rating Default Rate. WAL – Weighted average life.
Source: Fitch Ratings

For portfolios where the default patterns described in this report are not applicable, e.g. because the portfolio has a very short tenor or has an accelerated amortisation profile after the revolving period, Fitch may adjust the applied default patterns to account for the specifics of the analysed portfolio. Likewise, for portfolios with assets of notably long tenor exceeding 12 years, such as trust-preferred securities, multiple default peaks or extended default cycles may be applied to address the characteristics of the assets and the possibility the portfolio will experience multiple credit cycles.

When conducting cash flow analysis, Fitch's cash flow model first projects the portfolio scheduled amortisation proceeds and any prepayments for each reporting period of the transaction life assuming no defaults and no voluntary terminations, when applicable. In each rating stress scenario, these scheduled amortisation proceeds and prepayments are then reduced by a scale factor equivalent to the overall percentage of loans that are not assumed to default or to be voluntarily terminated, when applicable.

This adjustment avoids running out of performing collateral due to amortisation and takes account of the defaults projected to occur in each rating stress, such that they are realised in a manner consistent with Fitch's published default timing curve. During and after the global financial crisis many loans were subject to maturity amendments whereby lenders voluntarily agreed to extend the maturity, while borrowers continued to make interest payments. The margin rate was often increased as part of the amendment. Fitch believes this modelling approach is consistent with the observed amend and extend activity during the heightened default environment.

Interest Rate Stresses

Fitch analyses rising, falling and flat interest rate scenarios in its cash flow analysis. Rising and falling scenarios are in accordance with Fitch's [Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria](#).

Timing of Recoveries

Recoveries are assumed to be received following a lag period after default. Recoveries may come from either work-out or sale of the defaulted asset. For cash flow scenarios, Fitch assumes that recoveries are produced as a part of a work-out, in line with the manner in which its relevant corporate teams assign recovery assumptions.

We consider it more stressful to assume lags, in order to maximise negative carry, particularly given positions may be illiquid and price determination difficult. The timing of recoveries assumes no interest proceeds from defaulted assets over the time of the work-out period. This results in negative carry, as the liabilities have to be paid, while defaulted assets are assumed to generate no cash flow between default and recovery.

In cash flow analysis Fitch models an aggregated portfolio profile rather than individual assets. For US CLOs, the recovery lag is assumed to be 12 months. The recovery lag for European CLOs is 18 months for 'As' rating levels and higher, acknowledging less favourable workout regimes across European jurisdictions. For 'BBBs' and below, the recovery lag in European jurisdictions is 12 months. While EMEA CLOs can include US loans/bonds, these would typically not exceed 25% and we apply the same recovery lag for all assets in EMEA CLOs.

Additional Default Risk in Revolving Transactions

Managed transactions may also have the ability to reinvest recovery proceeds from defaulted assets, or from interest proceeds diverted via failure of an interest diversion test or other similar reinvestment over collateralisation test. These new assets are subject to default risk that is not reflected in the expected default rates derived by PCM. Instead, Fitch takes into account this additional default risk in its cash flow modelling approach.

We assume proceeds reinvested during the reinvestment period are used to purchase assets with the same risk profile as the outstanding performing portfolio at the time of the reinvestment. Collateral quality tests in transaction documentation typically incorporate a limited buffer relative to quality metrics of the actual portfolio. This is achieved by modelling reinvestment as an increase in the current portfolio size. To capture the default risk on these newly acquired assets, the periodic default rate applied on the outstanding performing portfolio is also applied to these assets, given they share the same credit characteristics. An example of the methodology is provided in *Appendix 8*.

Available Cash Investments

Fitch assumes cash balances held in a transaction's interest and principal collection accounts between payment dates will earn interest at a spread of 50bps below the relevant reference index, e.g. Euribor/SOFR/Libor, floored at zero. We will adjust these assumptions if the contractual rates are less favourable to the issuer than the above assumption.

Senior Fees and Asset Spreads

For corporate CDOs, the cash flow modelling is based on contractual management fees, which reflect market rates. Fitch may stress the senior fees on a case-by-case basis, if the contractual rates are deemed to be below the market rate. The basis for the fees may vary between transactions. Most commonly the senior fees are calculated based on the balance at the beginning of the period including defaulted assets at par.

Fitch's Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria include stresses to address the risk of negative interest rates in structured finance transactions. CLOs are unlikely to be affected by negative interest rates. Therefore, we apply the standard (positive) interest rate downward stresses in our CLO rating analysis.

Fitch tested the effect of different definitions, such as the average balance or excluding default assets, and found it has no material effect on the BDRs. Therefore, we will model the most common fee basis definition for all transactions. Asset spreads are based on the actual spread for static transactions and the covenanted minimum spread level for replenishing transactions.

Call Options

Historically, most CLO notes are repaid through the exercise of the call option, which typically is controlled by the CLO equity investors. Fitch's analysis assumes that the call option is not exercised and the CLO notes are repaid through asset repayments. Our ratings are therefore de-linked from the creditworthiness of the call option holder. We expect CLO indentures to specify that principal and accrued interest on all notes is paid in full as a condition to exercise the call option.

Long-Dated Assets

CLO structures that allow managers to invest in loans with maturity dates after the legal maturity of the bonds or perpetual bonds may expose the notes to the market value of those assets. Fitch expects limitations to be in place to restrict the ability of the manager to invest in such long-dated assets.

If the CLO structure allows the manager to acquire assets (either by way of outright purchase or exchange) with a tenor after the final note payment, we will assume such assets are subject to a fire sale prior to or at the last payment period and the CLO notes only receive the assumed recovery value.

In certain instances, the CLO structure may receive long-dated assets via maturity extensions or other types of distressed debt management techniques. Fitch views the overcollateralisation test haircuts applied to long-dated assets as a disincentive to use such provisions opportunistically. In the absence of a sufficient overcollateralisation test haircut, the Fitch stressed portfolio analysis would utilize the approach outlined above related to outright acquisitions.

For surveillance analysis, Fitch applies the same stress as the one described above for the outright purchases, for long dated assets held in the portfolio.

Some CLOs allow for the limited reinvestment of unscheduled principal proceeds and proceeds from the sales of credit risk and/or credit improved assets after the reinvestment period. In this case, Fitch expects the CLO transaction documents to contain sufficient provisions to limit the amount of the investment portfolio that may be outstanding as the transaction reaches maturity. Typically, this is accomplished by reducing the WAL test value down to zero by the end of the note amortisation period.

Over Collateralisation and Interest Coverage Tests

Fitch evaluates the prescribed calculations of a transaction's over collateralisation and interest coverage tests to determine whether such tests will effectively divert cash proceeds to the senior notes upon negative rating migration and/or defaults in the portfolio. The over collateralisation tests for most high-yield CLO transactions, for example, include multiple haircuts when calculating the par amount of collateral available to support the rated notes.

If Fitch believes such tests are calculated in a manner that renders them relatively ineffective, additional sensitivity scenarios or adjustments to Fitch's base case scenario may be warranted. Adjustments for inefficient over collateralisation measurements may include not modelling the over collateralisation tests during the reinvestment period, thereby not giving credit for excess spread while the asset manager can purchase additional assets.

CLO structures normally provide that assets rated in the 'CCC' rating category or lower, above a certain threshold (typically 7.5%), are carried at an adjusted value. This may mean over collateralisation tests become effective earlier than if they were to rely on defaulted assets alone. In lower rating stresses, categories 'Bsf' and 'BBsf', Fitch would expect obligors that ultimately default to first be rated 'CCC', causing over collateralisation tests to fail earlier.

In particular, Fitch assumes the proportion of 'CCC' assets in the portfolio to be a multiple of the projected default rate for the 12-month period ahead. We assume an average 12-month default rate for 'CCC' rated borrowers of 25%, which is consistent with empirical observations. This assumption implies a multiple of 'CCC' obligations to defaulted obligations of four times. For the 'BBsf' category scenarios, Fitch applies a multiple of 2.5x, and for the 'Bsf'/'CCCsf' category scenarios the applied multiple is 3.5x. These multiples are set below

the historical 4.0x average to account for the potential for higher-rated obligors jumping to default but without migrating to 'CCC' first. In both scenarios, the proportion of 'CCC' assets of the performing portfolio is capped at 50%.

The adjusted value for excess 'CCC' obligations in CLOs is typically the lower of par and their market value. Fitch does not model the market value explicitly but assumes that in lower rating stresses the recovery assumption is a good indicator for the market value. For example, assuming an RDR of 30%, the front-loaded default timing for a WAL of eight years allocates 8% of the RDR to year three. This corresponds to an assumed 2.4% of the initial target par amount of the portfolio ($30\% \times 8\%$) expected to default during year three. For a 'Bsf' scenario, Fitch assumes 8.4% ($3.5x \text{ 'Bsf'} \times 2.4\%$) of the portfolio to be rated 'CCC' or worse during the second year of the transaction life and for a 'BBsf' scenario 6.0% ($2.5x \text{ 'BBsf'} \times 2.4\%$).

Defaulted assets are typically included at the lower of the market value or a predetermined recovery rate, defined in the transaction documents. Fitch believes these haircuts can serve as early indicators of deteriorating collateral performance and are important for preserving a minimum ratio of underlying collateral value available to the senior notes.

Multi-Currency Structures

Most European CLOs use perfect asset swaps to hedge FX risk for non-Euro-denominated assets. Some structures can have limited exposure to UK pound and US dollar assets not covered by perfect asset swaps. The maximum currency bucket has been 10% to date, against 5% of liabilities, leaving a 5% of reinvestment target par mismatch between assets and liabilities (residual exposure).

The approach outlined here only applies to transactions where residual exposure, mismatch between assets and liabilities, does not exceed 10% of the transaction target par amount at closing. Market risk in the form of FX exposure should not be the primary rating driver in CLO structures. The approach outlined below will be applicable where the size of the FX bucket is limited and/or the effect on the rating, when compared with an all-Euro structure with similar characteristics is limited. Such an asset/liability hedging strategy is not perfect and exposes the structure to residual currency risk.

For example, defaults may reduce assets and as a result the FX liabilities have to be repaid by converting Euro proceeds at spot. Similarly, FX liabilities that rank pro rata with the corresponding euro tranche are less effective than, for example, variable funding notes. Unless the issuer receives the correct proportion of FX proceeds and Euro proceeds, it will have to convert one or the other at spot in order to maintain the pro rata split of the liability structure.

If for example the UK pound sub-portfolio has a significantly longer WAL than the Euro sub-portfolio, the effectiveness of the liability hedging could be significantly reduced, as the UK pound tranches would be repaid from Euro proceeds prior to receiving the UK pound proceeds, leaving the structure unhedged. To mitigate this risk, European CLOs include specific WAL tests for each sub-portfolio. To test the effectiveness of an imperfect asset/liability hedging, Fitch will test the structure by modelling stressed FX rates for each currency under the standard interest rate and default timing scenarios.

The FX stresses and the currency pair categorisation are published in an Excel file entitled [Fitch's Foreign-Currency Stress Assumptions for Residual Foreign-Exchange Exposures in Covered Bonds and Structured Finance](#). Both the definition of the stresses and the assignment of currency pairs to categories will be reviewed on a regular basis. A detailed description on Fitch's methodology for deriving these currency stresses is provided in [Covered Bonds Rating Criteria](#). These stresses are applicable to transactions with a typical WAL of up to eight years. Fitch will typically limit the interest rate differential for FX structures. This applies to scenarios where one index is stressed up, while the other is modelled down or flat. For example, in the case of UK pound/euro, Fitch would cap the difference between UK pound Libor and Euribor at 6%.

If defaults were to occur unevenly across such a portfolio, the effect of FX rates and interest rates on unhedged risks can be magnified in the structure. Therefore, for CDOs with FX exposure, Fitch will also analyse the impact of defaults skewed toward each sub-pool within its cash flow modelling framework. The following default skew stresses would be used for a multicurrency transaction, or transactions with significant fixed/floating interest rate mismatches.

Default Skew Stresses for Foreign-Exchange Mismatches

Rating Scenario	Pool One	Pool Two
AAA	62.5	37.5
AA	60.0	40.0
A	57.5	42.5
BBB	55.0	45.0
BB	52.5	47.5
B	50.0	50.0

Note: A 60%/40% default skew would imply that 60% of defaults would occur in Pool One if the pools were of equal weight. Please contact Fitch to obtain the default skew percentages for non-equally weighted portfolios.
Source Fitch Ratings

For very small FX exposures, which could include only a few assets, the committee may also consider a more significant skew proportion in assigning the rating.

Combination Notes

Combination notes are notes where tranches from CLOs or corporate CDOs are combined, in whole or in part, to form new securities. Combination notes may include other securities, such as government bonds. The cash flow modelling methodology outlined in this report is applied to determine the effect of the various scenarios described above on the principal and interest cash flows described in the terms and conditions of the combination note. Typically, the combination noteholders are entitled to all distributions of principal and interest on the underlying components. Combination notes may take many forms and each proposal needs to be evaluated on its specific merits.

The factors used by Fitch when deciding if the combination note is rateable include the following:

- Availability of sufficient information to analyse each of the underlying components; and
- The terms and conditions of the combination notes match the anticipated payment profile of the included notes.

The most common form of combination notes transforms bonds paying both principal and interest into principal-only notes. Credit enhancement is created by converting interest payments on highly rated notes to cover principal on lower-rated or unrated notes. The included components generate sufficient cash flows to satisfy repayment of the combination notes under the specified rating stress scenarios including use of the Fitch stressed portfolio and the indicative portfolio. If a potential principal shortfall exists in our cash flow analysis associated with a specific rating level, then that rating level can be assigned to the combination notes only in the presence of some form of additional credit enhancement that mitigates the shortfall.

Often, this additional credit enhancement will be one or more principal-only securities that are included to provide principal cash flows toward the end of the transaction. This would be available to offset potential shortfalls that occur in a stress scenario. In these instances, the combination notes' ratings are determined through the application of the Two-Risk Credit-Linked Notes Matrix in the [Single- and Multi-Name Credit-Linked Notes Rating Criteria](#), where the principal-only issuer and the combination notes are the risk-presenting entities.

We assume an additional administrative expense at the bottom of the CLO waterfall when calculating the cash flows available to CLO equity components of a combination note. The same analytical framework applied in the combination note analysis is used when analysing structures backed by notes of more than one CLO. Each distinct CLO portfolio and structure will be analysed separately using the same rating level stress levels. Then cash flows from each component of the combination note are aggregated for each of the nine interest rate and default timing scenario combinations.

The most conservative of the nine cash flow scenarios must be sufficient to repay the combination notes in accordance with their terms under the rating stress. For example, cash flows from the 'Asf' rating stress analysed in a rising interest rate and front default timing

Fitch will not rate new combination note structures on the basis of a "rated balance" that may differ from the "stated balance" of the notes over time as there is an elevated risk that the rating may be misconstrued or misunderstood by those relying on the rating like investors, risk managers or regulators.

Other structural considerations for combination noteholders include:

- Voting rights for supplemental indentures that may alter cash flows,
- Reporting and notifications to investors and rating agencies on distributions and outstanding balances.

scenario would be determined from each CLO component note. The resulting cash flows from all component notes, and other potential sources, such as pledged management fees, that secure the combination note would be applied to the combination note structure to test if cash flows are sufficient to support an 'Asf' rating.

Early redemptions, re-pricing or other features, such as allowances for additional indebtedness affecting the underlying component notes, may lower cash flows to the combination note beyond those assumed in Fitch's analysis of the indicative portfolio or Fitch stressed portfolio. To the extent these early redemption or re-pricing features exist in the underlying CLO, Fitch expects additional structural features to specifically address any potential adverse effect on the combination notes. The features may include: automatically exchanging the combination note back to its component notes; the combination notes being paid in full; allowing for 100% combination noteholder consent; or relying on confirmation that no rating changes would be expected in order to mitigate the risk of redemptions, re-pricing, or other features adversely affecting the combination notes.

The combination note structure should clearly define what happens to the underlying component notes after all the payments are paid or if the combination note is terminated early. The two most common structures involve either automatically exchanging the combination notes back into the underlying component notes or creating a structure with a residual class of notes. In exchangeable note structures Fitch will withdraw the rating on the combination notes after they are exchanged or mark them Paid in Full if the balance is reduced to zero. In residual class structures, once sufficient proceeds are received, or set aside as cash or highly-rated and liquid securities, to repay the nominal balance of the combination note, we will mark the combination notes ratings Paid in Full.

Counterparty Considerations

It is Fitch's understanding that any payments made by the borrowers or lenders under a syndicated loan structure, would typically be transferred by the agent within one business day to the borrower or issuer account. We, therefore, deem commingling and counterparty risk with regards to syndications agents as immaterial.

Excessive counterparty risk is typically not a concern in CLO structures, as the assets are sourced in the open market from different counterparties. Managers are also incentivised by the structure to avoid large cash holdings and many actually run negative trade date cash balances. The initial ramp period following closing is only six months. Finally, EMEA CLOs use derivative counterparties to hedge FX and interest rate risk through perfect asset swaps. The counterparty exposure is typically small and often spread across different counterparties.

Transaction-Specific Disclosure

In its initial rating report or initial Rating Action Commentary Fitch expects to disclose the following:

- Any variation to the rating mapping approach outlined in this report, for example if the mapping approach is applied to portfolios that fall outside the listed criteria;
- Correlation framework for EM portfolios, if different from the one outlined in this report;
- Any adjustments to the recovery rate assumptions;
- Any adjustment to asset default assumptions due to adverse selection, as indicated by an over proportional share of Negative Outlooks;
- Any specific stresses applied to the Fitch stressed portfolio for risk factors other than those outlined in this report; examples include 'CCC' limits and long-dated assets;
- If and why a committee assigned a rating different to the model implied rating;
- Adjustments for inefficient over collateralisation tests;
- Adjustments to the applied default patterns; and
- Comparison analysis of mid-cap portfolio financial ratios with the ones reported in Fitch's Leveraged Loan Chart Book for borrowers in the same jurisdiction.

In its surveillance Rating Action Commentary related to an upgrade or downgrade Fitch would expect to disclose the following:

- If and why a committee assigned a rating different to the model implied rating;
- Any adjustment to asset default assumptions due to adverse selection, as indicated by an over proportional share of Negative Outlooks;
- Any mitigating factors to concentration risk, for example short remaining life for the notes, or performance history of the transaction, if a committee decided not to downgrade a transaction with excessive obligor concentration.

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 effect 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.

Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's [Ratings Definitions](#). In addition, ratings within the scope of these criteria are subject to the following specific limitations:

- The criteria report does not cover any market value risk associated with corporate bonds or loans.

Rating Assumption Sensitivity

Fitch will run a range of sensitivity analyses on key input parameters to examine the rating stability of each rated note. The objective of this stress testing is not to eliminate rating migration through unrealistically conservative assumptions but rather to test that a small change in input parameters does not result in a multi-category downgrade.

The sensitivity analysis results will be published in our presale and new issue reports for each rated transaction and is performed for initial ratings or material restructurings. For surveillance reviews or CLO refinancings analysed based on the surveillance approach outlined in the next section the initial sensitivity analysis is typically still applicable and we will refer to results of initial sensitivity analysis.

Fitch will review the effect on the rating for the following sensitivities:

- **Rating sensitivity to default probability:** multiplier of 125% and 150% applied to mean RDR, with increase in the mean RDR added to all other rating level RDRs.
- **Rating sensitivity to recovery rates:** multiplier of 75% and 50%, i.e. 25% and 50% haircuts, respectively, applied to the RRR for all rating levels.
- **Combined stress:** default probability multiplier of 125% applied to mean RDR, with increase in the mean RDR added to all other rating-level RDRs, and recovery rate multiplier of 75%.
- **Combined stress:** default probability multiplier of 150% applied to mean RDR, with increase in the mean RDR added to all other rating-level RDRs, and recovery rate multiplier of 50%.

- **Upgrade combined sensitivity:** default probability multiplier of 75% applied to mean RDR, with the change in mean RDR subtracted from all other rating-level RDRs, and recovery rate multiplier of 125%.

The tables below show the sensitivity results for two example portfolios. The analysis is only based on the asset performance, excluding structural features and cash flow modelling.

Portfolio One: Leveraged Loan CLO

Initial Rating	Base RLR (%)	Indicative Rating						
		RDR + 25% x mean	RDR + 50% x mean	75% x RRR	50% x RRR	RDR + 25% x mean; 75% x RRR;	RDR + 50% x mean; 50% x RRR	RDR -25% x mean; 125% x RRR
AAAsf	40.1	AA+sf	AAsf	AAsf	A+sf	A+sf	BBB+sf	AAAsf
AAsf	34.7	A+sf	A+sf	A+sf	BBB+sf	Asf	BBB-sf	AAAsf
Asf	26.3	BBB+sf	BBB+sf	BBB+sf	BB+sf	BBB-sf	BB-sf	A+sf
BBBsf	18.8	BB+sf	BB+sf	BB+sf	B+sf	BB-sf		A-sf
BBsf	12.6	B+sf	B+sf	B-sf				BBB+sf
Bsf	8.8							BB+sf

RLR – Rating Loss Rate. RDR – Rating Default Rating. RRR – Rating Recovery Rating. Note: Geographic location largest countries: France (30.7%), Germany (16.0%). 98 borrowers. Asset quality 'B-' (34.8%), 'B+' (8.6%), 'B' (48.8%), 'CCC' (2.3%), balance in 'BB' category. 90% senior secured loans. Portfolio WAL – 62 months. Largest industry 14.3%. Source: Fitch Ratings

Portfolio Two: Investment Grade CDO

Initial Rating	Base RLR (%)	Indicative Rating						
		RDR + 25% x mean	RDR + 50% x mean	75% x RRR	50% x RRR	RDR + 25% x mean; 75% x RRR;	RDR + 50% x mean; 50% x RRR;	RDR -25% x mean; 125% x RRR
AAAsf	11.7	AA+sf	AA+sf	AA+sf	AA+sf	AA+sf	AAsf	AAAsf
AAsf	9.6	AA-sf	AA-sf	AA-sf	AA-sf	AA-sf	A+sf	AAsf
Asf	6.9	A-sf	A-sf	A-sf	A-sf	A+sf	BBB+sf	Asf
BBBsf	4.5	BBB-sf	BBB-sf	BBB-sf	BB+sf	BB+sf	BB+sf	BBB+sf
BBsf	2.4	BB-sf	BB-sf	BB-sf	B+sf	B+sf	B-sf	BB+sf
Bsf	1.5	B-sf	B-sf	B-sf				BB-sf

RLR – Rating Loss Rate. RDR – Rating Default Rating. RRR – Rating Recovery Rating. CDO – Collateralised debt obligation. Geographic location: US 300 equally weighted assets. 'BBB' rated assets. 100% senior unsecured loans. Five-year bullet loans. Diversified industry exposure. Source: Fitch Ratings

Portfolio Performance and Surveillance

Outstanding ratings are reviewed at least annually. Transactions may be taken to credit committee more frequently, as warranted by performance or structural changes due to amendment activity, to maintain timely ratings on all Fitch-rated CDOs.

Appendix 1: Asset Default Rates

Cumulative Asset Default Rates

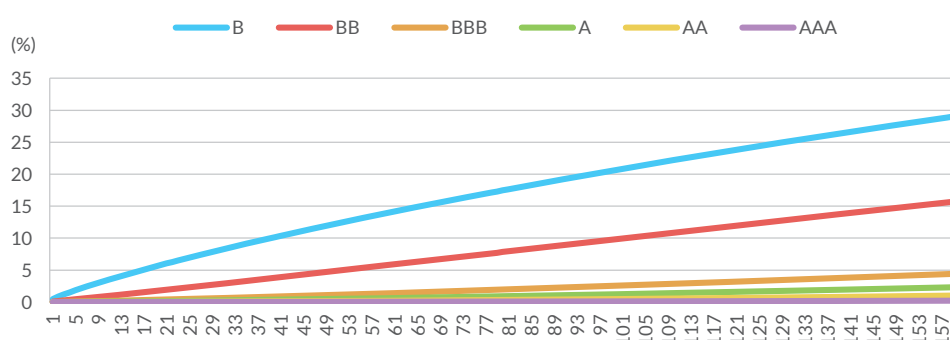
(%)	Term (Years)									
Fitch IDR	1	2	3	4	5	6	7	8	9	10
AAA	0.010	0.015	0.026	0.039	0.053	0.068	0.084	0.100	0.118	0.136
AA+	0.011	0.032	0.058	0.089	0.125	0.163	0.205	0.250	0.298	0.349
AA	0.016	0.048	0.092	0.145	0.208	0.278	0.356	0.441	0.532	0.629
AA-	0.020	0.063	0.122	0.194	0.279	0.375	0.481	0.598	0.723	0.858
A+	0.039	0.111	0.204	0.314	0.439	0.576	0.726	0.886	1.057	1.237
A	0.070	0.178	0.309	0.456	0.617	0.789	0.972	1.164	1.364	1.572
A-	0.116	0.278	0.463	0.665	0.880	1.107	1.343	1.588	1.840	2.099
BBB+	0.157	0.368	0.605	0.861	1.131	1.413	1.705	2.006	2.315	2.630
BBB	0.199	0.459	0.748	1.057	1.382	1.719	2.067	2.424	2.789	3.162
BBB-	0.513	1.084	1.677	2.283	2.898	3.519	4.145	4.774	5.406	6.039
BB+	0.862	1.755	2.655	3.556	4.457	5.354	6.249	7.138	8.023	8.903
BB	1.050	2.202	3.388	4.590	5.800	7.013	8.227	9.437	10.644	11.844
BB-	1.842	3.563	5.221	6.832	8.401	9.932	11.429	12.894	14.328	15.733
B+	2.664	4.940	7.060	9.069	10.991	12.837	14.618	16.340	18.008	19.627
B	3.807	6.723	9.330	11.734	13.983	16.108	18.127	20.054	21.899	23.671
B-	7.539	11.923	15.492	18.585	21.348	23.861	26.174	28.323	30.332	32.221
CCC+	11.227	17.023	21.548	25.354	28.674	31.633	34.311	36.759	39.016	41.111
CCC	14.833	22.071	27.576	32.112	36.000	39.413	42.457	45.204	47.705	50.000
CCC-	25.681	34.857	41.220	46.147	50.174	53.574	56.511	59.088	61.377	63.431
CC	50.500	56.500	62.500	68.500	74.500	80.500	86.500	92.500	98.500	100.00
C	75.500	81.500	87.500	93.500	99.500	100.00	100.00	100.00	100.00	100.00
D	100	100	100	100	100	100	100	100	100	100

IDR – Issuer Default Ratings. Note: The full 30-year table of default probability assumptions is available in the PCM.
Source: Fitch Ratings

The Weibull distribution was used to create a monthly term structure of default probabilities for 30 years, for each notched rating level. The Weibull distribution is often used in modelling survival rates and incorporates the exponential distribution but is more flexible in that it does not rely on constant hazard rates.

The distribution has a shape and scale parameter, which are estimated by numerically fitting the cumulative distribution to the cumulative target default rates for the one-, five- and 10-year horizons. The chart below graphically illustrates how the same distribution with different parameterisation can provide term structures for rating levels from 'AAA' to 'CCC-'.

Weibull Distribution: Probability of Default Term Structure



Source: Fitch Ratings.

Appendix 2: The Portfolio Credit Model

The PCM is used for analysing the joint default behaviour within credit portfolios. The model is based on the Gaussian copula function, which is based on the multivariate normal distribution Φ_{Σ} with pair-wise correlation matrix Σ . An important benefit of the Gaussian copula is its analytical tractability. The dependence structure is fully described by the pair-wise linear correlation assumption. For example, zero correlation in the Gaussian copula means all the default events are independent.

The key inputs to the model are default probabilities, correlation and recovery rates. The key output of the model is the default or loss distribution for a given credit portfolio. A correlation structure can be implemented in factor form.

For example, the one factor representation of the Gaussian copula is given by the following equation:

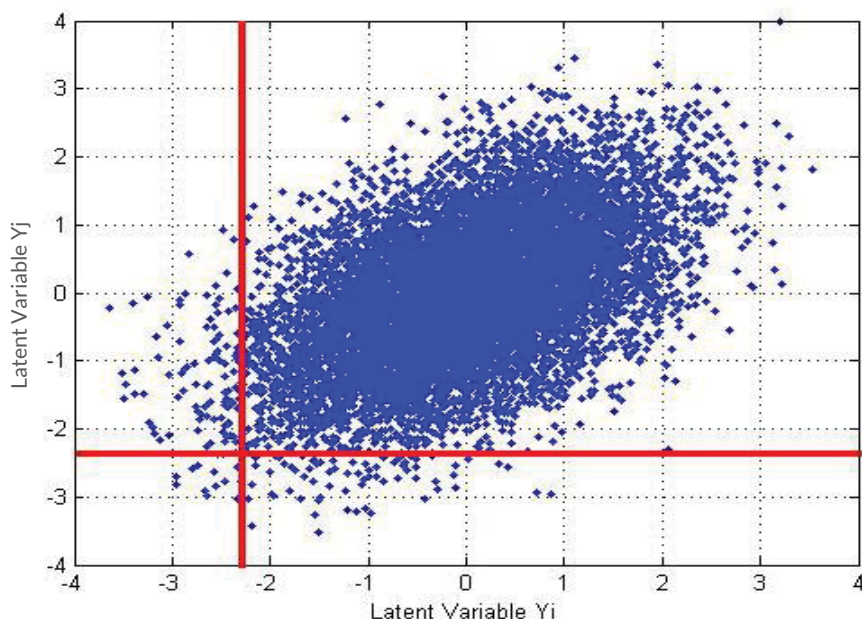
$$Y_i = \beta X + \sqrt{1 - \beta^2} \varepsilon_i$$

Here Y_i is a latent variable associated with credit i in the portfolio.

The Gaussian copula is often interpreted as a structural form model, which was pioneered by Merton. This model holds that a company defaults if the value of its assets falls below the value of its liabilities at debt maturity. Depending on the assumption with respect to the asset value process, it can be proven that the structural form model and the Gaussian copula are equivalent,

if the default occurs at maturity. The latent variable Y_i can therefore be interpreted as the standardised asset value for company i .

A default occurs if the latent variable Y_i falls below a threshold K_i . In the Gaussian copula the factor X and the idiosyncratic risk ε_i are standard normal random variables with zero mean and a standard deviation of one. The specific functional form of the factor model Y_i is also a standard normal variable with a mean of zero and standard deviation of one. Therefore, to match the default probability p_i the threshold K_i is computed as the inverse of the cumulative random normal distribution of the default probability, ie $K_i = \Phi^{-1}(p_i)$. Company i defaults if, $Y_i < \Phi^{-1}(p_i) \Leftrightarrow \Phi(Y_i) < p_i$.



Source: Fitch Ratings

Dependence is introduced by correlating the Y variables through the common factor X.

The pair-wise correlation between Y_i and Y_j is given by β^2 .

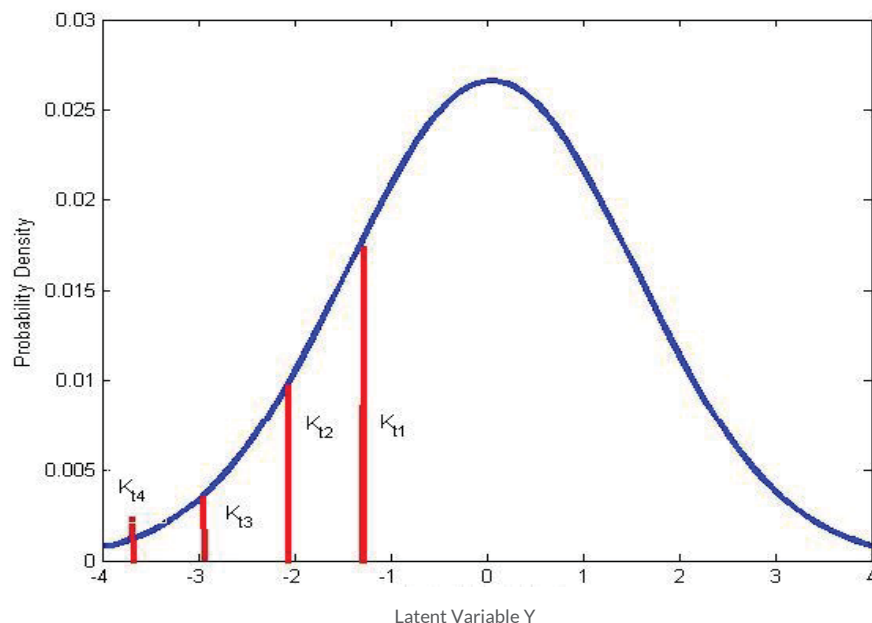
The one-factor model can be extended to a multi-factor model, which allows a more asset-specific correlation structure. The PCM incorporates a multi-factor correlation model which will be described in more detail in Appendix 3. For a portfolio of just two credits (bi-variate case) the Gaussian copula function can be illustrated graphically, as shown in Figure 18.

The scatter plot shows the joint distribution of the two latent variables (asset values) Y_i and Y_j . The red lines illustrate their respective default thresholds. The bottom left hand corner of the scatter plot shows the occurrences when both credits default.

So far, this paper has focused on a model with a specified fixed maturity T. The model can also be used to infer the joint time to default for all the credits in the portfolio. Given a term-structure of default probabilities F_i for a specific credit in the portfolio, the time to default τ_i is given by

$$\tau_i = F^{-1}(\Phi(Y_i))$$

In other words, rather than specifying just one threshold K to determine whether an asset defaults at time T, the latent variable Y is compared to a specific threshold for each point in time.

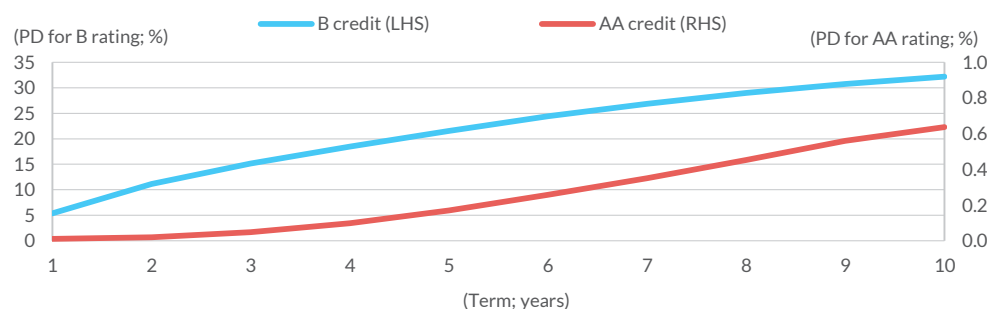


Source: Fitch Ratings.

In the PCM, the default probability term structures are derived from historical default rates rather than implied by spread or price levels. The chart below shows the term structure of default probabilities for a 'AA' and a 'B' rated asset.

The portfolio loss distribution for a fixed time horizon T can be generated using the Monte Carlo Simulation as follows¹.

Term Structure of Default Probabilities



Source: Fitch Ratings

1. Calculate the thresholds $K_i = \Phi^{-1}(p_i)$ for each credit. Here p_i is the default probability for name i that corresponds to the time horizon T.
2. Simulate a vector of independent standard normally distributed random variables ε_i (one for each credit in the portfolio).
3. Simulate a scalar standard normally distributed random variable for the factor value X.

¹The loss distribution of the one factor Gaussian copula can be derived much faster by semi-analytic techniques such as recursion or fast Fourier transform methods. The model also has a closed-form large homogeneous portfolio approximation. Nevertheless, all of these can only be used in a single-factor framework. For multi-factor extension, which the PCM is based on, Monte Carlo Simulation is the most efficient numerical scheme.

4. Compute $Y_i = \beta X + \sqrt{1 - \beta^2} \varepsilon_i$; for equal pair-wise correlation ρ between all credits $\beta = \sqrt{\rho}$.
5. The default time $\tau_i \leq T$, if the latent variable $Y_i \leq K_i(T)$.
6. Compute the portfolio loss as the sum up the loss given default of all credits (LGD) that defaulted prior to T. The PCM uses deterministic recovery rates.
7. Repeat steps 2 to 6 several thousand times. Compute the loss distribution as the histogram of portfolio losses over all simulation scenarios. The histogram is an approximation of the exact loss distribution and the numerical accuracy improves the larger the number of simulations.

CDO portfolios often include assets with different maturity dates or even amortising assets. The loss given default for a specific issuer in the CDO portfolio is derived from the outstanding notional of all assets in the portfolio at the time of default. Therefore, the simulation time horizon is effectively equal to the maturity of the longest asset in the portfolio.

Appendix 3: Correlation Calibration

Given the choice of model (Gaussian copula) and the corporate and CDO default rates, the only remaining parameter that would affect the default distribution produced by the model is the correlation. Generally, Fitch expects that the RDR for higher rating levels of 'Asf' and above should cover at least the historical peak default rate.

In order to calibrate the correlation assumption, we used large homogenous, randomly selected portfolios that resembled the cohort portfolios underlying the historical default studies. The objective was to find a single pair-wise correlation parameter, such that the RDR produced by PCM reflected the expected coverage of the historically observed peak. The table shows the RDR at each rating category for portfolios with different underlying credit qualities and tenors.

These were generated using the PCM with the following assumptions:

- Historical corporate default rates;
- CDO default rates equal to historical corporate default rates;
- Gaussian copula model; and
- 10% equal pair-wise correlation between all assets in the portfolio.

Model RDR for Equally Weighted Portfolio of 300 Assets with 10% Flat Pair-Wise Correlation, Historical Corporate and CDO Default Tables

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
RDR	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAA _{sf}	49.3	60.7	30.0	41.3	12.0	17.7
AA _{sf}	43.7	54.0	25.0	34.7	9.3	13.7
A _{sf}	38.7	49.0	21.3	30.3	7.3	11.3
BBB _{sf}	35.0	45.0	18.3	27.0	6.0	9.3
BB _{sf}	27.3	36.3	13.3	20.0	4.0	6.0
B _{sf}	22.0	30.3	10.0	16.0	2.7	4.3
Expected	14.0	23.7	5.8	11.8	1.4	3.2
Coverage of Mean						
AAA _{sf}	3.5	2.6	5.2	3.5	8.6	5.5
AA _{sf}	3.1	2.3	4.3	2.9	6.6	4.3
A _{sf}	2.8	2.1	3.7	2.6	5.2	3.5
BBB _{sf}	2.5	1.9	3.2	2.3	4.3	2.9
BB _{sf}	2.0	1.5	2.3	1.7	2.9	1.9
B _{sf}	1.6	1.3	1.7	1.4	1.9	1.3
Coverage of Peak						
AAA _{sf}	1.3	1.3	1.4	1.4	2.4	1.9
AA _{sf}	1.1	1.1	1.2	1.2	1.9	1.5
A _{sf}	1.0	1.0	1.0	1.1	1.5	1.2
BBB _{sf}	0.9	0.9	0.9	0.9	1.2	1.0
BB _{sf}	0.7	0.8	0.6	0.7	0.8	0.6
B _{sf}	0.6	0.6	0.5	0.6	0.5	0.5

RDR – Rating Default Rate. CDO – Collateralised debt obligation.
Source: Fitch Ratings

The table shows the historical peak default rate for each rating category and term. The peak default rates were based on the published data from three rating agencies. The second and the third tables show the multiple of the model RDR over the respective mean and peak default rate at each rating level. For example, a portfolio of 300 equally weighted 'BBB' assets with a 10-year

term has a portfolio default rate at 'AAAsf' of 17.7%. The historical 'BBB' 10-year mean and peak default rates are 3.2% and 9.3%, respectively. The resulting multiple coverage of the mean default rate is 5.5x and of the peak default rate is 1.9x.

These results highlight some interesting properties of the model. Firstly, the multiples increase for shorter tenors and higher credit quality, which is mainly a result of the historical term structure and peak default rates.

The multiple coverage of the base default rate for sub-investment-grade ratings with the same correlation is less than 3.0x due to the higher base case. Secondly, the coverage of the mean and peak default rates at the 'BBBs' rating levels appear high relative to the 'AAAsf' coverage and the implied tiering between 'AAAsf' and 'BBBs' lower-rating CDO ratings is inconsistent between rating levels.

Therefore, the following adjustments were applied to the model:

1. Reduce correlation from 10% to 8%, in order to address the relatively high multiples at liability ratings of 'BBB' and below.
2. Lower the CDO default rates for 'AAAsf', and 'AAsf' and 'Asf', increases the level of confidence. This adjustment will compensate for the lower correlation assumption and maintain the RDR for 10-year 'AAAsf' and 'AAsf' rating levels. The two tables below show the empirical default rates and the target CDO default probability assumptions.
3. Floor the CDO default rates at 1bp, which mainly affects the short maturities. This adjustment was not part of the calibration but rather required to achieve convergence within the Monte Carlo Simulation. A level of confidence greater than 99.99% would require a very large number of simulations in order to achieve convergence.

Historical Default Rates

(Adjusted Fitch Composite)

(%)	1	2	3	4	5	6	7	8	9	10
AAA	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.10	0.12	0.14
AA+	0.01	0.03	0.06	0.09	0.12	0.16	0.21	0.25	0.30	0.35
AA	0.02	0.05	0.09	0.15	0.21	0.28	0.36	0.44	0.53	0.63
AA-	0.02	0.06	0.12	0.19	0.28	0.37	0.48	0.60	0.72	0.86
A+	0.04	0.11	0.20	0.31	0.44	0.58	0.73	0.89	1.06	1.24
A	0.07	0.18	0.31	0.46	0.62	0.79	0.97	1.16	1.36	1.57
A-	0.12	0.28	0.46	0.66	0.88	1.11	1.34	1.59	1.84	2.10

Source: Fitch Ratings

Adjusted CDO Target Default Rates

(Adjusted Fitch Composite 'AAAsf', 'AAsf', 'Asf' CDO Default Rates)

(%)	1	2	3	4	5	6	7	8	9	10
AAAsf	0.01	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.08
AA+sf	0.01	0.01	0.02	0.03	0.04	0.05	0.07	0.09	0.11	0.13
AAsf	0.01	0.01	0.03	0.05	0.07	0.10	0.13	0.16	0.20	0.24
AA-sf	0.01	0.02	0.05	0.08	0.12	0.16	0.21	0.26	0.32	0.39
A+sf	0.01	0.04	0.08	0.14	0.20	0.28	0.37	0.47	0.58	0.70
Asf	0.02	0.07	0.13	0.21	0.31	0.41	0.53	0.66	0.80	0.95
A-sf	0.05	0.13	0.24	0.37	0.52	0.68	0.86	1.05	1.25	1.46

CDO - Collateralised debt obligation.

Source: Fitch Ratings

Model RDR for Equally Weighted Portfolio of 300 Assets with 8% Flat Pair-Wise Correlation, Adjusted CDO Default Tables

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
RDR	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAA _{sf}	47.0	58.7	28.0	39.3	11.0	17.0
AA _{sf}	43.7	54.3	25.3	35.3	9.7	14.3
A _{sf}	38.3	48.7	21.3	30.3	7.7	11.3
BBB _{sf}	32.3	42.7	16.7	25.3	5.3	8.7
BB _{sf}	25.7	35.0	12.3	19.3	3.7	6.0
B _{sf}	21.3	29.7	9.7	15.7	2.7	4.3
Expected	14.0	23.7	5.8	11.8	1.4	3.2
Coverage of Mean						
AAA _{sf}	3.4	2.5	4.8	3.3	7.9	5.3
AA _{sf}	3.1	2.3	4.4	3.0	6.9	4.5
A _{sf}	2.7	2.1	3.7	2.6	5.5	3.5
BBB _{sf}	2.3	1.8	2.9	2.1	3.8	2.7
BB _{sf}	1.8	1.5	2.1	1.6	2.6	1.9
B _{sf}	1.5	1.3	1.7	1.3	1.9	1.3
Coverage of Peak						
AAA _{sf}	1.2	1.2	1.3	1.4	2.2	1.8
AA _{sf}	1.1	1.1	1.2	1.2	2.0	1.5
A _{sf}	1.0	1.0	1.0	1.1	1.6	1.2
BBB _{sf}	0.8	0.9	0.8	0.9	1.1	0.9
BB _{sf}	0.7	0.7	0.6	0.7	0.7	0.6
B _{sf}	0.6	0.6	0.5	0.5	0.5	0.5

RDR – Rating Default Rate. CDO – Collateralised debt obligation.
Source: Fitch Ratings

Historical rates for ‘AAA’, ‘AA’ and ‘A’ rating levels are based on small cohort portfolios with very few defaults. As a result, the historical default rates at ‘AAA_{sf}’, ‘AA_{sf}’ and ‘A_{sf}’ are strongly influenced by event risk in the cohort portfolios².

In other words, one idiosyncratic default in these small cohorts can have an outsized effect on the observed default rate. The input default probabilities for issuers with rating levels of ‘AAA’, ‘AA’ and ‘A’ are nevertheless based on the empirically observed default rates, in order to incorporate possible event risk among the underlying corporates.

Moreover, the adjustment to correlation and the CDO target default rates is equivalent to tiering the correlation assumptions by rating stress. In other words, for rating levels of ‘BBB_{sf}’ and below, Fitch assumes an equivalent correlation of 8%, while for higher rating levels the effective equivalent correlation is higher, between 8% and 10%.

² Since the historical default data are insufficient to obtain statistically significant differences by industries, Fitch assumed the performance of different industry classes would be similar in a stressed environment. Therefore, in the model, the intra industry correlation was assumed to be the same for each of the industries and industry sectors.

Industry Concentration and the Corporate Correlation Model

This report has so far focused on randomly selected portfolios diversified across industries. A flat pair-wise correlation is not sufficient to distinguish between well diversified portfolios and those with concentrations in particular industries or countries. Fitch believes that industry concentration within a credit portfolio could significantly increase the volatility of portfolio default rates.

In order to distinguish between diversified and concentrated portfolios the one factor model was extended to a multi-factor model. All of the factors are independent standard normal random variables. The following equation illustrates the correlation model.

$$Y_i = \alpha F_{Global} + \beta F_{Region} + \gamma F_{country} + \kappa F_{Glob_IndSector} + \delta F_{Glob_Industry} + \varphi F_{Local_Industry} + \omega \varepsilon_i$$

$$\omega = \sqrt{1 - \alpha^2 - \beta^2 - \gamma^2 - \kappa^2 - \delta^2 - \varphi^2}$$

The correlation assumptions are differentiated based on geography (region and country) and industry sector/industry. Industries are further separated depending on exposure to global and local performance drivers. The correlation framework is additive and any additional commonality between two assets adds a correlation uplift to the pair-wise correlation level of these two assets. The uplifts are given as the square of the factor exposures, i.e. $\alpha^2; \beta^2; \gamma^2; \delta^2; \varphi^2$.

PCM Industry Sectors and Industries; Main Countries and Regions

Sectors and Industry breakdown	Country	Region
Telecom media and technology – sector	Australia	Australia & New Zealand
Technology hardware	New Zealand	Australia & New Zealand
Technology software	Hong Kong	Developed Asia
Telecommunications	Japan	Developed Asia
Broadcasting and media	Singapore	Developed Asia
Cable	South Korea	Developed Asia
Industrials – sector	Taiwan	Developed Asia
Aerospace and defence	Austria	Europe Central
Automobiles	Belgium	Europe Central
Building and materials	France	Europe Central
Chemicals	Germany	Europe Central
Industrial and manufacturing	Liechtenstein	Europe Central
Metals and mining	Luxembourg	Europe Central
Packaging and containers	Netherlands	Europe Central
Real estate	Switzerland	Europe Central
Transportation and distribution	Denmark	Europe North
Retail leisure and consumer – sector	Finland	Europe North
Consumer products	Iceland	Europe North
Environmental services	Norway	Europe North
Food, beverage and tobacco	Sweden	Europe North
Retail food and drug	Cyprus	Europe South
Gaming and leisure and entertainment	Gibraltar	Europe South
Retail	Greece	Europe South
Healthcare devices	Italy	Europe South
Healthcare providers	Malta	Europe South
Lodging and restaurants	Portugal	Europe South
Pharmaceuticals	Spain	Europe South
	Ireland	Europe UK & Ireland
	Jersey	Europe UK & Ireland

Source: Fitch Ratings

PCM Industry Sectors and Industries; Main Countries and Regions (Continued)

Sectors and industry breakdown	Country	Region
Energy – sector	UK	Europe UK & Ireland
Energy oil and gas	Canada	North America
Utilities power	US	North America
Banking and finance – sector		
Banking and finance		
Business services – sector		
Business services general		
Business services data and analytics		

Source: Fitch Ratings

Other Countries and Regions in the Portfolio Credit Model

Country	Region	Country	Region
Argentina	Americas	Albania	Europe
Bahamas	Americas	Bosnia and Herzegovina	Europe
Barbados	Americas	Bulgaria	Europe
Brazil	Americas	Croatia	Europe
Chile	Americas	Czech Republic	Europe
Colombia	Americas	Eastern Europe Others	Europe
Costa Rica	Americas	Estonia	Europe
Dominican Republic	Americas	Hungary	Europe
Ecuador	Americas	Kazakhstan	Europe
El Salvador	Americas	Latvia	Europe
Guatemala	Americas	Lithuania	Europe
Jamaica	Americas	Macedonia	Europe
Mexico	Americas	Moldova	Europe
Other Central America	Americas	Poland	Europe
Other South America	Americas	Romania	Europe
Panama	Americas	Russia	Europe
Peru	Americas	Serbia and Montenegro	Europe
Puerto Rico	Americas	Slovakia	Europe
Uruguay	Americas	Slovenia	Europe
Venezuela	Americas	Ukraine	Europe
Asia Others	Asia	Egypt	Middle East and Africa
China	Asia	Iran	Middle East and Africa
India	Asia	Israel	Middle East and Africa
Indonesia	Asia	Liberia	Middle East and Africa
Malaysia	Asia	Middle East and North Africa Others	Middle East and Africa
Marshall Islands	Asia	Morocco	Middle East and Africa
Mauritius	Asia	Other Sub-Saharan Africa	Middle East and Africa
Pakistan	Asia	Qatar	Middle East and Africa
Philippines	Asia	Saudi Arabia	Middle East and Africa
Thailand	Asia	South Africa	Middle East and Africa
Vietnam	Asia	Tunisia	Middle East and Africa
		Turkey	Middle East and Africa
		Bermuda	North America
		Cayman Islands	North America

Source: Fitch Ratings

For example, the pair-wise correlation between the latent variables of two assets from the same region but different countries and industries is given by $\alpha^2 + \beta^2$. Similarly, if two assets come from different regions but the same industry, their pair-wise correlation is equal to $\alpha^2 + \delta^2$. The uplift for local industries is only applied if two assets come from the same country and the same industry. The final correlation uplifts are detailed in the *Correlation Framework* table.

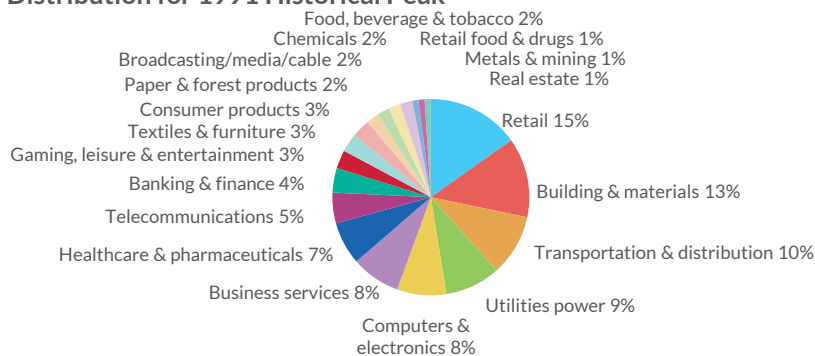
The *PCM Industry Sectors and Industries; Main Countries and Regions* table shows country and industry mapping in the PCM. Every non-EM country is mapped to one of seven regions and one of six industry sectors. The six industry sectors are further broken down into 29 industry classes. Two assets within an industry receive the same uplift in correlation regardless of whether they are within the same country or not. The global industry effect is assumed to dominate the performance of these credits. A good example would be two oil companies that are heavily dependent on the spot price of oil.

Calibration of Industry and Industry Sector Correlation for a US Portfolio

The calibration of the industry correlation model was again based on historical default rates as published in cohort studies. Since the majority share of the data is US-based, the calibration of the intra- and inter-industry correlation assumptions were done for a large randomly selected US portfolio, thereby replicating the cohort portfolios of historical default studies.

The base calibration in the previous section was focused on historical mean and peak default rates. For example, RDR for the 'Asf' rating stress level was expected to cover the historically observed peak default rate. Since the historical peak default rates included some industry concentration this had to be taken into account for calibrating the industry correlation model. While the largest industry concentration was seen in 2001-2002 cohorts, which had a large exposure to telecommunications, previous peak cohorts did not exhibit the same level of concentration. Fitch, therefore, used the less concentrated industry distribution of the 1991 peak cohort as shown in the chart below.

Industry Distribution for 1991 Historical Peak



Source: Fitch Ratings

We used default rates observed for the telecom sector for the period of 2001, 2002 and 2003, during which this sector underwent the most severe stress observed in any corporate sector in the last decade. Our analysis showed during this time, of the 158 US issuers in this sector, 78 defaulted in these three years, yielding a default rate of 49.4%. The rating profile of the sector is shown below:

Rating	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	NR
#Issuers	2	2	8	2	12	24	37	39	1	31

The following table shows the RDR produced by PCM for a single sector, equally weighted US portfolio, with a three-year term and a rating distribution as shown above. Issuers that were not rated were assumed to be rated 'BB'. The pairwise correlation levels were 28%. The RDR for the 'Asf' rating stress covers the observed default rate within this sector.

Rating Default Rate	3 Year
Model Output (%)	
AAA _{sf}	67.7
AA _{sf}	63.3
A _{sf}	53.2
BBB _{sf}	40.5
BB _{sf}	27.9
B _{sf}	19.0
Expected	7.9

The calibration of the industry correlation model was intended to: yield results for the 1991 peak portfolio that were the same or close to RDR levels given by base calibration in the previous section; and produce increases in the RDR and the multiple coverage for industry and sector concentrations when compared to a diverse portfolio. The calibration was based on three benchmark portfolios.

Portfolio One – 1991 Peak

- 300 equally weighted assets with the same term and rating.
- Single-country US portfolio.
- Industry distribution as observed during the 1991 peak cohort.

Portfolio Two – Diverse

- 300 equally weighted assets with the same term and rating.
- Single-country US portfolio.
- Equal share in each of the 29 corporate industries.

Portfolio Three – 30% Industry Concentration

- 300 assets with the same term and rating.
- Single-country US portfolio.
- 30% in banking and finance; remainder diverse across other industries.

Model RDR for 1991 Peak Portfolio

RDR	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAA _{sf}	47.3	58.7	28.3	39.7	11.7	17.3
AA _{sf}	44.0	54.7	25.7	35.7	10.3	14.7
A _{sf}	38.7	48.7	21.7	30.3	8.0	11.7
BBB _{sf}	32.7	43.0	17.0	25.3	5.7	9.0
BB _{sf}	26.0	35.0	12.7	19.3	3.7	6.0
B _{sf}	21.3	30.0	9.7	15.7	2.7	4.3
Expected	14.0	23.7	5.8	11.8	1.4	3.2
Coverage of Mean						
AAA _{sf}	3.4	2.5	4.9	3.4	8.4	5.4
AA _{sf}	3.1	2.3	4.4	3.0	7.4	4.6
A _{sf}	2.8	2.1	3.7	2.6	5.7	3.7
BBB _{sf}	2.3	1.8	2.9	2.1	4.1	2.8
BB _{sf}	1.9	1.5	2.2	1.6	2.6	1.9
B _{sf}	1.5	1.3	1.7	1.3	1.9	1.3
Coverage of Peak						
AAA _{sf}	1.2	1.2	1.3	1.4	2.4	1.9
AA _{sf}	1.2	1.1	1.2	1.2	2.1	1.6

Model RDR for 1991 Peak Portfolio

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
Asf	1.0	1.0	1.0	1.1	1.6	1.3
BBBsf	0.9	0.9	0.8	0.9	1.2	1.0
BBsf	0.7	0.7	0.6	0.7	0.7	0.6
Bsf	0.6	0.6	0.5	0.5	0.5	0.5

RDR – Rating Default Rate. Note: Equally weighted portfolio of 300 US assets with correlation assumptions: base 2%; industry sector uplift 2% and industry uplift of 20%.

Source: Fitch Ratings

Model RDR for Diverse Portfolio

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
RDR	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAAAsf	45.0	56.7	26.7	37.7	10.3	16.0
AAAsf	42.0	52.7	24.0	34.0	9.3	13.7
Asf	37.0	47.3	20.3	29.0	7.3	11.0
BBBsf	31.3	41.7	16.3	24.7	5.3	8.7
BBsf	25.3	34.3	12.3	19.0	3.7	6.0
Bsf	21.0	29.7	9.7	15.3	2.7	4.3
Expected	14.0	23.7	5.8	11.8	1.4	3.2

RDR – Rating Default Rate. Note: Equally weighted portfolio of 300 US assets with correlation assumptions: base 2%; industry sector uplift 2% and industry uplift of 20%.

Source: Fitch Ratings

The tables show the results for each of the benchmark portfolios with a base level correlation of 6%, an industry sector uplift of 2% and an industry uplift of 20%. For example, two assets in the same industry would have a pair-wise correlation of 28%, while two assets from different industries but within the same industry sector would have a pair-wise correlation of 8%.

As a result of higher intra-industry correlation and sector correlation uplift, the base level correlation for the US was reduced to 6% from the 8% in the examples above, in order to maintain the results from the previous section for portfolio one. The chosen correlation levels closely replicate the results shown in Figure 26. The same correlation assumptions were also applied to the second calibration portfolio which was fully diverse and included an equal share in each of the 29 corporate industries.

Model RDR for Industry Concentrated Portfolio (30% Industry Concentration)

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
RDR	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAAAsf	49.0	60.0	30.7	41.3	13.7	19.3
AAAsf	45.7	55.7	27.7	37.0	11.7	16.0
Asf	40.0	50.0	23.0	31.7	8.7	12.3
BBBsf	33.7	43.7	18.0	26.3	6.0	9.3
BBsf	26.7	35.3	13.0	19.7	3.7	6.0
Bsf	21.7	30.0	9.7	15.7	2.7	4.3
Expected	14.0	23.7	5.8	11.8	1.4	3.2

RDR – Rating Default Rate. Note: Equally weighted portfolio of 300 US assets with correlation assumptions: base 2%; industry sector uplift 2% and industry uplift of 20%.

Source: Fitch Ratings

The RDRs for portfolios with sizable industry concentrations are significantly higher compared with a fully diversified portfolio.

Calibration for Regionally Diverse Portfolios

The available default data outside the US is limited and does not prove whether a regionally diverse portfolio would perform differently to a portfolio of only US assets. However, it is Fitch's view that diversification can be achieved across regions. Therefore, the base level correlation for assets from different regions is lowered to four percentage points (pp), with an uplift of 2% for all non-EM regions. This recovers the 6% base level correlation for North America, while giving limited diversification benefit for assets from different regions. The results shown in the tables remain unchanged for an all-US portfolio.

Furthermore, Fitch believes that portfolios concentrated in any single country outside the US could have more volatile default rates than a portfolio diversified across the US. Therefore, the base level correlation in the model for any two non-US assets within the same country is increased by 4%. For example, the pair-wise correlation between two German assets from different industries would be 10%, which compares with the 6% between two similar US assets.

Since western Europe is split into four regions in the PCM the regional benefit, together with the country correlation uplift, balance each other out and results in a portfolio diversified across western European countries being treated similar to an all US portfolio of similar assets. Fitch recognizes that the correlation structure is only a model and, like other models, relies on assumptions. However, the model is designed to differentiate between concentrated and diverse portfolios.

Fitch's corporate correlation assumptions are shown in the *Correlation Framework* table above. The *Model RDR for 1991 Peak Portfolio – Single Country (Non-US)* table and *Model RDR for 1991 Peak Portfolio – Diversified Across Five European Countries* table provide results for the large homogenous and randomly chosen benchmark non-US portfolios, using the full correlation structure.

The *Model RDR for 1991 Peak Portfolio – Single Country (Non-US)* table shows results for a single country portfolio, outside North America, which compares to the *Model RDR for 1991 Peak Portfolio* table. The RDRs are higher for non-US single-country concentrations, reflecting our expectations such portfolios may be subject to more volatile portfolio default rates than a diversified US portfolio.

Model RDR for 1991 Peak Portfolio – Single Country (Non-US)

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAA _{sf}	56.3	67.0	35.7	47.7	15.7	22.3
AA _{sf}	52.0	62.0	32.0	42.3	13.3	18.7
A _{sf}	45.7	55.0	26.3	35.7	10.0	14.0
BBB _{sf}	37.7	47.7	20.3	29.0	7.0	10.3
BB _{sf}	29.0	37.7	14.3	21.0	4.3	6.3
B _{sf}	23.0	31.0	10.3	16.3	2.7	4.3
Expected	14.0	23.7	5.8	11.9	1.4	3.2

RDR – Rating Default Rate.
Source: Fitch Ratings

The *Model RDR for 1991 Peak Portfolio – Diversified Across Five European Countries* table shows the results for a portfolio with no industry concentrations, which is diversified across western European countries. Here the results are comparable with a diversified US portfolio, as shown in *Model RDR for Diverse Portfolio* table.

Model RDR for 1991 Peak Portfolio – Diversified Across Five European Countries

	Asset Rating: B		Asset Rating: BB		Asset Rating: BBB	
	5 Year	10 Year	5 Year	10 Year	5 Year	10 Year
Model Output (%)						
Peak	38.2	47.9	21.0	28.8	4.9	9.3
AAA _{sf}	49.0	60.7	30.0	41.3	12.7	18.3
AA _{sf}	45.7	56.3	27.0	37.0	10.7	15.7
A _{sf}	40.3	50.0	22.7	31.7	8.3	12.3
BBB _{sf}	33.7	44.0	17.7	26.3	6.0	9.3
BB _{sf}	26.7	35.7	13.0	19.7	4.0	6.0
B _{sf}	21.7	30.3	10.0	15.7	2.7	4.3
Expected	14.0	23.7	5.8	11.9	1.4	3.2

RDR – Rating Default Rate.
Source: Fitch Ratings

Appendix 4: Standard Recovery Rate Assumptions

The assumptions are applied per rating category, e.g. for the 'A+sf' rating level, the assumption shown in the column 'Asf' is applied. In instances where Fitch provided asset-specific RRs and a specific recovery estimate, then the recovery rate assumption will be interpolated based on the assumptions for the recovery estimate, as shown in the *Asset-Specific Recovery Rate Assumptions* table.

Asset-Specific Recovery Rate Assumptions Group 1 and 2

Recovery Rating (%)	AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
RR1 (outstanding: 91-100%)	60	70	80	90	95	95
RR2 (superior: 71-90%)	45	55	65	75	80	85
RR3 (good: 51-70%)	30	35	45	55	60	65
RR4 (average: 31-50%)	10	15	20	25	40	45
RR5 (below average: 11-30%)	0	5	10	15	20	25
RR6 (poor: 0-10%)	0	0	0	0	5	5

Source: Fitch Ratings

Asset-Specific Recovery Rate Assumptions – Group 3

Recovery Rating (%)	AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
RR1	5	10	30	50	70	90
RR2	5	10	20	35	50	70
RR3	0	5	15	25	35	50
RR4	0	0	5	10	20	30
RR5	0	0	0	0	5	10
RR6	0	0	0	0	0	0

Source: Fitch Ratings

For assets without Fitch-assigned recovery rates, recovery assumptions will primarily be based on the seniority of the actual debt instrument and issuer type, as detailed in the *Recovery Rate Assumptions* table. Senior secured loans from non-middle-market entities, issuers with a public rating from Fitch, Moody's or S&P, correspond to "Strong recovery". Senior secured bonds correspond to their named category and senior unsecured bonds correspond to "Moderate recovery". Other debt instruments, including second-lien loans, will commonly be categorised as "Weak recovery". However, where actual recovery experience is less than might be expected for the level of seniority, a lower categorisation may be used in specific cases.

Senior secured loans from Group 1 issuers that do not have a public rating from Fitch, Moody's or S&P will correspond to the "Strong recovery MML" category. Non-senior secured loans from middle market Group 1 issuers will correspond to the "Weak recovery" category. However, for loans from issuers in Group 1 countries that have received a private rating or credit opinion from Fitch and include a Fitch-assigned recovery estimate or recovery rating, the Fitch-assigned recovery estimate or recovery rating will be used to determine a recovery assumption. In the absence of a Fitch-assigned recovery estimate or recovery rating, loans from these issuers will be considered middle-market loans.

US issuers that file for bankruptcy often issue debtor-in-possession (DIP) instruments with instrument recovery expectations likely to be higher than the pre-petition loans from the borrower. As a majority of DIP instruments are expected to perform better than the pre-petition loans of a bankrupt borrower, Fitch will incorporate a recovery assumption in line with an RR of 'RR1', where it identifies a loan as a DIP instrument. The PCM also includes recovery assumptions for sovereign exposures, which may be used for, e.g. state-owned enterprises. The recovery assumptions are published in [Covered Bonds and CDOs Public Entities Asset Analysis Rating Criteria](#).

Recovery Rate Assumptions

Recovery Prospects (%)	AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
Group 1 – US mainly						
Strong recovery	40	50	60	70	75	80
Strong recovery MML	35	40	50	60	65	70
Senior secured bonds	30	35	45	55	60	65
Moderate recovery	10	15	20	25	40	45
Weak recovery	0	0	5	10	15	20
Group 2 – Europe						
Strong recovery	35	40	50	60	65	70
Senior secured bonds	30	35	45	55	60	65
Moderate recovery	10	15	20	25	40	45
Weak recovery	0	0	5	10	15	20
Group 3 – Other						
Strong recovery	5	10	15	20	30	35
Moderate recovery	0	0	5	10	20	25
Weak recovery	0	0	0	0	5	5

MML – Middle market loan.
Source: Fitch Ratings

Group 1

Australia, Bermuda, Canada, Cayman Islands, New Zealand, Puerto Rico, United States.

Group 2

Austria, Barbados, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Gibraltar, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Jersey, Latvia, Liechtenstein, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Singapore, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Taiwan, UK.

Group 3

Albania, Argentina, Asia Others, Bahamas, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Dominican Republic, Eastern Europe Others, Ecuador, Egypt, El Salvador, Greece, Guatemala, Hungary, India, Indonesia, Iran, Jamaica, Kazakhstan, Liberia, Macedonia, Malaysia, Malta, Marshall Islands, Mauritius, Mexico, Middle East and North Africa Others, Moldova, Morocco, Other Central America, Other South America, Other Sub Saharan Africa, Pakistan, Panama, Peru, Philippines, Qatar, Romania, Russia, Saudi Arabia, Serbia and Montenegro, South Africa, Thailand, Tunisia, Turkey, Ukraine, Uruguay, Venezuela, Vietnam.

The following tables show the recovery rates for Portugal and Italy, adjusted in accordance with the principles stated in the section Sovereign-Related Risk. In both cases, the recovery rate assumptions at the rating level of the country cap were equal to the 'AAAsf' recovery assumptions described above; the base case continues to be based on the country group. Note that recoveries may change as the country cap changes.

Interpolation Example for Specific Recovery Estimates

In instances where Fitch is provided with a specific recovery estimate by the corporate group, the recovery assumptions will be interpolated between the closest two recovery ratings, based on the 'BBsf' column, which corresponds to the mid-point recovery rate for each RR band. We defined interpolation rows in 5pp increments. The interpolation is linear and based on the closest two rows. The last row in the table shows the resulting recovery rates for a recovery estimate of 67%.

Asset-Specific Recovery Rate Assumptions

Recovery Rating (%)	Interpolation Boundary	AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
	100	60	70	80	90	100	100
Group 1 and 2 RR1 (outstanding: 91-100%)	95	60	70	80	90	95	95
	90	55	65	75	85	90	90
	85	50	60	70	80	85	90
Group 1 and 2 RR2 (superior: 71-90%)	80	45	55	65	75	80	85
	75	40	50	60	70	75	80
	70	35	45	55	65	70	75
	65	35	40	50	60	65	70
Group 1 and 2 RR3 (good: 51-70%)	60	30	35	45	55	60	65
	55	25	30	40	45	55	60
	50	20	25	35	40	50	55
	45	15	20	25	35	45	50
Group 1 and 2 RR4 (average: 31-50%)	40	10	15	20	25	40	45
	35	5	10	15	20	35	40
	30	0	5	10	15	30	35
	25	0	5	10	15	25	30
Group 1 and 2 RR5 (below average: 11-30%)	20	0	5	10	15	20	25
	15	0	0	5	10	15	20
	10	0	0	0	5	10	15
Group 1 and 2 RR6 (poor: 0-10%)	5	0	0	0	0	5	5
	0	0	0	0	0	0	0
Recovery Estimate	67	35	42	52	62	67	72

RR – Recovery Rating.
Source: Fitch Ratings

Appendix 5: Fitch IDR Equivalency Map

For the purposes of analysing corporate CDOs, the Fitch IDR is one of the primary drivers of default probability for the underlying portfolio assets. In the absence of an IDR, Fitch will map to the equivalent IDR rating from the security rating of another instrument within the issuer's capital structure. Ratings assigned to guaranteed instruments will only be taken into account to the extent the underlying guarantee relates to the issuer, rather than the specific debt instrument. For example, a guarantee by a parent to a subsidiary, which leads to a higher rating for the debt issued by the subsidiary would be considered. On the other hand, a guarantee provided by a sovereign on the specific bond of a bank would be disregarded when deriving the IDR from the instrument rating.

In the event that Fitch does not provide any ratings or Credit Opinions for the issuer, public or private, we will look to the public ratings provided by Moody's or S&P. To determine the equivalent IDR rating from either Moody's or S&P, Fitch will apply the mapping illustrated below. If there are public ratings provided by both agencies, the lower of the two IDR equivalent ratings will be applied. Otherwise, the sole IDR equivalent rating from either Moody's or S&P will be applied.

The IDR equivalent rating for all assets subject to a Negative Rating Watch is the credit rating minus one notch. This adjustment is made prior to mapping from the issue rating to the IDR equivalent rating.

Fitch may provide a Credit Opinion on the issuer, attribute a rating of 'CCC' to the issuer or, depending on the issuer and/or portfolio characteristics, assume a rating other than 'CCC'. For example, if Fitch is aware that other agencies have a private rating higher than 'CCC', unrated assets may be considered as 'B-' instead of 'CCC' if the share of unrated assets is sufficiently large to become a driver of the rating. Another example would be if an entity is classified as defaulted by any manager and there is insufficient public information available, Fitch would typically treat such credit exposures as 'D'.

Credit Opinions are generally point-in-time views and are not subject to monitoring or surveillance by the corporates team. CLO managers provide detailed reporting on a monthly basis, including defaulted issuers and issuers treated as 'CCC'. Trustee report data and/or major market- or company-specific events may prompt a reassessment of the Credit Opinion. Credit Opinions are assessed at least annually. If Credit Opinions cannot be assessed because of missing information within the 12-month timeframe, Fitch will assess the asset as a 'CCC' risk until an updated Credit Opinion is performed.

Fitch IDR Equivalency Map from Corporate Ratings

Rating Type	Rating Agency(s)	Issue Rating	Mapping Rule
Corporate family rating long-term issuer rating	Moody's	N.A.	0
Issuer credit rating	S&P	N.A.	0
Senior unsecured	Fitch, Moody's, S&P	Any	0
Senior debt: senior secured or subordinated secured	Fitch, S&P	BBB- or above	0
	Fitch, S&P	BB+ or below	-1
	Moody's	Ba1 or above	-1
	Moody's	Ba2 or below	-2
	Moody's	Ca	-1
Subordinated debt: junior subordinated or senior subordinated	Fitch, Moody's, S&P	B+, B1 or above	1
	Fitch, Moody's, S&P	B, B2 or below	2

N.A. – Not applicable.
Source: Fitch Ratings

The Following Steps Are Used to Calculate the Fitch IDR Equivalency Rating

1	Public Fitch LT IDR or LT IDCO.
2	If Fitch has not issued a LT IDR or LT IDCO, but has an outstanding IFSR, the Fitch IDR Equivalency Rating is one rating notch lower.
3	If Fitch has not issued a LT IDR, LT IDCO or IFSR, but has outstanding corporate issue ratings, the Fitch IDR Equivalency Rating is calculated using the Fitch IDR Equivalency Table.
4	If Fitch does not rate the issuer (LT IDR, LT IDCO, IFSR) or any associated issuance, it determines a Moody's and S&P equivalent to Fitch's LT IDR pursuant to steps 5 and 6.
5a	A public Moody's-issued CFR is equivalent in terms of definition to the Fitch LT IDR; if Moody's has not issued a CFR, but has a public LT issuer rating, this is equivalent to the Fitch LT IDR.
5b	If Moody's has not issued a CFR or LT issuer rating, but has a public insurance financial strength rating, the Fitch IDR Equivalency Rating is one rating notch lower.
5c	If Moody's has not issued a CFR, LT issuer rating or insurance financial strength rating, but has public corporate issue ratings, the Fitch IDR Equivalency Rating is calculated using the Fitch IDR Equivalency Table.
6a	A public S&P-issued ICR is equivalent in terms of definition to the Fitch LT IDR.
6b	If S&P has not issued an ICR, but has an outstanding insurance financial strength rating, the Fitch IDR Equivalency Rating is one rating notch lower.
6c	If S&P has not issued an ICR or insurance financial strength rating, but has public corporate issue ratings, the Fitch IDR Equivalency Rating is calculated using the Fitch IDR Equivalency Table.
7	If both Moody's and S&P provide a public rating on the issuer or an issue, the lower of the two Fitch IDR Equivalency Ratings will be used; otherwise the sole public Fitch IDR Equivalency Rating calculated from Moody's or S&P will be applied provided that if any rating described above is on Rating Watch Negative, the rating will be adjusted down by one rating notch before the Fitch IDR Equivalency Rating is determined.

LT IDR – Long-Term Issuer Default Rating. LT IDCO – Long-Term Issuer Default Credit Opinion. IFSR – Insurer Financial Strength Rating. CFR – Corporate Family Rating. ICR – Issuer Credit Rating.
Source: Fitch Ratings

Appendix 6: Calculation of Fitch WARF and Fitch WARR

The Fitch WARF is a numerical value that describes the weighted average credit quality of the portfolio. Each asset is assigned a numerical value with respect to the credit quality of that particular issuer. Fitch's rating factor scale equates to the 10-year asset default rate used in Fitch's PCM. The first step in calculating the Fitch WARF is to determine the Fitch IDR Equivalency Rating for each collateral obligation in the portfolio, in accordance with the process described in Appendix 5. We then multiply the notional balance of the asset by the Rating Factor associated with the Fitch IDR Equivalency Rating from the *Fitch WARF and WARR Scales* table below and sum these products. Finally, we divide the sum by the total notional balance of the portfolio.

The first step in calculating the Fitch WARR is to determine the recovery factor for each collateral obligation in the portfolio. We then multiply the notional balance of the asset by the recovery factor associated and sum these products. Finally, we divide the sum by the total notional balance of the portfolio. Our WARR for the portfolio is calculated using the recovery estimate value or recovery rating for the issue when available or the 'BBsf' rating stress assumption based upon seniority of the actual debt instrument and issuer type of each asset if a recovery estimate or recovery rating is unavailable. The table below displays the corresponding recovery factor for each instrument and issuer type.

Fitch WARF and WARR Scales

Fitch IDR Equivalency Rating	Rating Factor
AAA	0.136
AA+	0.349
AA	0.629
AA-	0.858
A+	1.237
A	1.572
A-	2.099
BBB+	2.630
BBB	3.162
BBB-	6.039
BB+	8.903
BB	11.844
BB-	15.733
B+	19.627
B	23.671
B-	32.221
CCC+	41.111
CCC	50.000
CCC-	63.431
Fitch Recovery Classification – Group 1 and 2	Recovery Factor
RR1	95
RR2	80
RR3	60
RR4	40
RR5	20
RR6	5
Fitch Recovery Classification	Recovery Factor
Group 1 – Strong	75
Group 1 – Strong US middle market loan	65
Group 1 – Senior secured bond	60
Group 1 – Moderate	40
Group 1 – Weak	15
Group 2 – Strong	65
Group 2 – Senior secured bond	60
Group 2 – Moderate	40

Fitch WARF and WARR Scales

Group 2 – Weak	15
Group 3 – Strong	30
Group 3 – Moderate	20
Group 3 – Weak	5

WARF – Weighted average rating factor. WARR – Weighted average recovery rate. IDR – Issuer Default Rating.
Fitch IDR Equivalency Ratings of 'CC', 'C', and 'D' are considered defaulted. Fitch Recovery Factors for Group 3 RR1, RR2, RR3, RR4, RR5 and RR6 are 70, 50, 35, 20, 5, and 0, respectively.
Source: Fitch Ratings

Appendix 7: Default Timings

Share of RDR (%)

Year ^a	WAL-1	WAL-2	WAL-3	WAL-4	WAL-5	WAL-6	WAL-7	WAL-8	WAL-9	WAL-10 and Above
Front-Loaded Default Timing										
1	100	50	50	44	41	37	35	33.5	33	32.5
2	-	50	35	30	27.5	24.5	23.5	22.5	22	21.5
3	-	-	15	13	10.5	10	9	8	7	6
4	-	-	-	13	10.5	10	9	8	7	6
5	-	-	-	-	10.5	10	9	8	7	6
6	-	-	-	-	-	8.5	9	8	7	6
7	-	-	-	-	-	-	5.5	8	7	6
8	-	-	-	-	-	-	-	4	6	6
9	-	-	-	-	-	-	-	-	4	6
10	-	-	-	-	-	-	-	-	-	4
Mid-Loaded Default Timing										
1	100	50	35	30	27.5	9.5	8	7	6	5
2	-	50	50	44	41	24.5	8.5	7.25	6	6
3	-	-	15	13	10.5	37	23.5	8	6	6
4	-	-	-	13	10.5	9.75	35	22.5	6	6
5	-	-	-	-	10.5	9.75	8.5	33.5	22	6
6	-	-	-	-	-	9.5	8.25	7.5	33	21.5
7	-	-	-	-	-	-	8.25	7.25	7	32.5
8	-	-	-	-	-	-	-	7	7	6
9	-	-	-	-	-	-	-	-	7	6
10	-	-	-	-	-	-	-	-	-	5
Back-Loaded Default Timing										
1	100	50	30	20	16	13	10	-	-	-
2	-	50	35	22.5	17	14	12.5	10	-	-
3	-	-	35	27.5	17	14	12.5	12.5	10	-
4	-	-	-	30	25	14	12.5	12.5	12.5	10
5	-	-	-	-	25	22.5	12.5	12.5	12.5	12.5
6	-	-	-	-	-	22.5	20	12.5	12.5	12.5
7	-	-	-	-	-	-	20	20	12.5	12.5
8	-	-	-	-	-	-	-	20	20	12.5
9	-	-	-	-	-	-	-	-	20	20
10	-	-	-	-	-	-	-	-	-	20

^aWe use these annual default curves and interpolate quarterly assumptions in our cash flow modelling. Within those interpolations, the WAL of the portfolio is rounded to the nearest quarter to determine the corresponding default timing curve. These quarterly default curves are available in Fitch's Portfolio Credit Model. RDR – Rating Default Rate. WAL – Weighted average life.
Source: Fitch Ratings

Appendix 8: Allocation of Defaults to Reinvestments

The table below illustrates how defaults are allocated to reinvestments. The example consists of a portfolio with an eight-year bullet maturity and a 30% default rate, applied over a mid-loaded default timing scenario. For simplicity, Fitch assumes USD10 of recovery proceeds are received and reinvested in year four.

The periodic default rate relative to the outstanding, rather than initial, performing balance of the portfolio is used to derive defaults in the reinvestment portfolio. Accordingly, the relative default rate applied to the remaining original portfolio from year four onward, when reinvestment occurs, is also applied to the reinvestment portfolio.

The relative default rate on the remaining portfolio from year four onward is equal to the sum of the portions of the initial 30% default rate applied in years four to eight (6.8%, 10.1%, 2.3%, 2.2% and 2.1% for a total of 23.3%) divided by the remaining portfolio balance in year four. This indicates a relative default rate on the remaining portfolio of $23.3/93.3 = 25\%$. This 25% default rate is then applied to the reinvestment portfolio over years four to eight, as displayed in row h in the table below.

Default Methodology Example

Row	Calculation								
a	Total default rate (%)	30.0	-	-	-	-	-	-	-
b	Year	1	2	3	4	5	6	7	8
c	Default timing (% of initial portfolio)	7.00	7.25	8.00	22.50	33.50	7.50	7.25	7.00
d	Outstanding performing portfolio (USD)	100.0	97.9	95.7	93.3	86.6	76.5	74.3	72.1
e	(c)x(a) Periodic default rate (% of initial portfolio)	2.1	2.2	2.4	6.8	10.1	2.3	2.2	2.1
f	(e)/(d) Periodic default rate (% of outstanding portfolio)	2.1	2.2	2.5	7.2	11.6	2.9	2.9	2.9
g	Outstanding reinvestment portfolio (USD)	-	-	-	10.0	9.3	8.2	8.0	7.7
h	(g)x(f) Default amount using periodic default rate (USD)	-	-	-	0.7	1.1	0.2	0.2	0.2

Source: Fitch Ratings

Appendix 9: Sample Asset Manager Operational Assessment Agenda

Organisation

- Firm background, legal/ownership structure overview.
- Assets under management (AUM) & business lines overview.
- CLO issuance strategy.
- Staffing summary.

CLO Portfolio Management and Loan Investment Process

- Team structure and process:
 - Team composition – number of portfolio managers (PMs)/analysts/support staff.
 - Profile of key executives and PMs.
 - PM/analyst responsibilities, lines of communication, frequency of team meetings.
 - Team workload – number of credits per analyst; division of labour between junior and senior analysts.
 - Articulation of loan investment process.
 - Asset screening/deal flow.
 - Credit write-up example.
 - Investment committee (composition, authority and approval process).
 - Overview of CLO management strategy and positioning.
- Loan monitoring:
 - Analyst responsibilities.
 - Processing of public information and quarterly filings.
 - Use of third-party information or proprietary technology to support credit analysis.
 - Frequency of credit meetings (scheduled or ad hoc).
 - Frequency of full portfolio reviews.
 - Internal process for managing credits.
 - ♦ Determining buy/sell, internal scoring/ratings.
 - ♦ Early-warning system, sale indicators.
 - ♦ Distressed credits.
- Portfolio Management Tools:
 - Overview of front-end system, other PM reports (demo or screenshots).
 - Strategies for portfolio optimisation (overview of current or future technology).
 - Overview of proprietary or third-party applications.
 - Interaction between PMs/credit team and systems and tools used.
 - Planned enhancements.

Technology/CLO Administration

- IT infrastructure and staff overview:
 - In-house vs. outsourced functions (CLO specific)
- Front/middle/back office systems integration:
 - Overview of key individuals and roles.
 - CLO compliance monitoring.
 - Pre-trade compliance process and PM communication with operations team.
 - Trustee monitoring (data files, frequency, reconciliation process); parallel testing of hypothetical trades.
 - Data feeds used for pricing, ratings, etc.
- Disaster recovery and business resumption plans:
 - Backup routines.
 - Overview of plan in the event of business disruption.
 - Cybersecurity measures.

Procedures and Controls (Specific to CLO Operations)

- Internal audit process.
- External audits, recent SEC examinations and material findings.
- Review frequency of policies and procedures manuals.

Appendix 10: RRR Interpolation Grids for Market Standard European Leveraged Loan CLOs and US Middle-Market CLOs

European CLOs and US middle-market CLOs include a matrix of different combinations of WARR, WARF and WAS covenants. Due to the size of the matrix it is not feasible for Fitch to create a bespoke stress portfolio for each WARR point. To analyse the covenant matrix, Fitch would create an interpolation table based on the minimum required senior secured exposure under the transaction documents. The *CLO RRR Grid for WARR<50%* table and the *CLO RRR Grid for WARR≥50%* table show the interpolation tables for a typical European or US middle market CLO transaction with at least 90% senior secured exposure.

For example, for a WARR covenant of 62.5% the RRR value for each rating stress would be interpolated as a midpoint between RRRs for a WARR of 60% and 65%. The 'BBBs' RRR for the 62.5 WARR covenant will be 53.35%, i.e. the average between 50.2% and 56.5%, which are the 'BBBs' RRR levels for the 60 WARR and 65 WARR shown in *CLO RRR Grid for WARR≥50%*.

CLO RRR Grid for WARR<50%

WARR Covenant (%)	0	5	10	15	20	25	30	35	40	45
AAA	0.00	0.00	0.00	0.70	2.60	4.30	6.10	7.90	9.70	14.40
AA	0.00	0.00	1.40	3.40	5.70	7.80	9.90	12.30	14.70	19.40
A	0.00	0.00	3.20	6.20	8.90	11.50	14.10	16.90	19.90	25.40
BBB	0.00	0.00	4.80	8.90	12.20	15.20	18.30	21.70	25.00	32.00
BB	0.00	4.60	9.70	14.60	20.00	25.10	29.50	34.60	40.00	44.60
B	0.00	4.90	12.00	18.00	23.70	29.10	34.00	39.40	44.90	50.00
CCC	0.00	4.90	12.00	18.00	23.70	29.10	34.00	39.40	44.90	50.00

RRR – Rating Recovery Rate. WARR – Weighted average recovery rate.
Source: Fitch Ratings

CLO RRR Grid for WARR≥50%

WARR Covenant (%)	50	55	60	65	70	75	80	85	90	95
AAA	19.00	23.30	27.70	32.50	36.70	40.50	44.90	50.30	54.30	59.50
AA	24.20	29.00	33.70	38.90	44.00	48.70	53.80	59.50	64.10	69.40
A	31.40	36.60	41.90	47.70	53.10	57.90	63.40	69.20	74.20	79.50
BBB	38.70	44.30	50.20	56.50	62.20	67.00	72.80	78.70	83.70	89.10
BB	49.50	54.10	58.70	63.80	68.70	73.30	78.50	84.40	89.00	94.40
B	54.90	59.40	64.00	68.60	73.40	77.70	82.60	87.10	91.40	94.90
CCC	54.90	59.40	64.00	68.60	73.40	77.70	82.60	87.10	91.40	94.90

RRR – Rating Recovery Rate. WARR – Weighted average recovery rate.
Source: Fitch Ratings

For a US BSL CLO that includes a Fitch WARR covenant, a committee may decide to use the tables above or an alternative grid that is based on the anticipated recovery distribution for the US BSL CLO. The alternative grid will be disclosed in the transaction's rating publication.

Appendix 11: Fitch Reporting

The publication of Fitch's analytical inputs in the regular CLO reporting for investors further strengthens our core principles – objectivity, independence, integrity, and transparency. The following is a list of asset-specific and portfolio attributes.

- Fitch Long-Term IDR (LT IDR) or Long-Term Issuer Default Credit Opinion (LT IDCO^a), Watch or Outlook status and effective date, if publicly available.
- Fitch RR or Credit Opinion RR if publicly available.
- Fitch Industry classification, if publicly available.
- Fitch IDR Equivalency Rating^b.
- Fitch Rating Factor in line with Appendix 6.
- Fitch Recovery Classification in line with Appendix 6.
- Fitch Recovery Factor in line with Appendix 6.
- Current Fitch WARF in line with Appendix 6.
- Maximum Fitch WARF test covenant, if applicable.
- Current Fitch WARR in line with Appendix 6.
- Minimum Fitch WARR test covenant, if applicable.
- Total notional balance of assets with a Fitch IDR or IDCO of 'CCC+' or lower.
- Concentration of assets with a Fitch IDR or IDCO of 'CCC+' or lower expressed as a percentage of all assets.
- Total notional balance of assets with a Fitch IDR Equivalency Rating of 'CCC+' or lower.
- Concentration of assets with a Fitch IDR Equivalency Rating of 'CCC+' or lower expressed as a percentage of all assets.
- Largest Fitch industry concentration expressed as a percentage of all assets.
- Second-largest Fitch industry concentration expressed as a percentage of all assets.
- Third-largest Fitch industry concentration expressed as a percentage of all assets.
- Notional balance of asset.
- Asset maturity date.
- Asset name.
- Asset identifier (CUSIP, ISIN, LX ID, LIN, or FIGI).
- Obligor name.
- Total notional balance of all assets.
- Total balance of cash.
- Eligible investments.
- Total notional balance of defaulted assets.
- Concentration of defaulted assets expressed as a percentage of all assets.

^aFitch IDCO should be shown in lower case with an asterisk. For example, "b-*".

^bCollateral obligations have a Fitch IDR Equivalency Rating

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Structured Finance CDOs Surveillance Rating Criteria

Sector-Specific Criteria

Scope

This criteria report outlines the global framework that Fitch Ratings uses to monitor and analyze ratings on existing issues of structured finance collateralized debt obligations (SF CDOs) backed by portfolios of ABS, RMBS, CMBS and CDO bonds. These criteria are used in conjunction with the related criteria listed on page 2. The analysis of CDOs issued between 2004 and 2007, where collateral is predominantly U.S. commercial real estate loans (CREL), is addressed in Fitch's "North America and Asia-Pacific Multiborrower CMBS Surveillance Criteria."

Key Rating Drivers

The ratings of existing SF CDO transactions are based on various key rating drivers. These drivers determine the appropriate rating actions and drive the implementation of certain rating caps. While all key rating drivers are equally important, not all will be relevant or have equal weighting in any one rating action, and as transactions season and/or concentrations increase over time, alternative loss considerations may have a greater weighting.

Default Probability of Assets: An asset's individual rating and term to maturity are the main parameters for its likelihood of default. Along with default correlation, these characteristics determine the magnitude of defaults in the portfolio over the life of a CDO.

Correlation Impact: High default correlation results in a higher portfolio default for a given confidence interval. Higher-rated notes must be able to withstand a wider range of defaults with a higher correlation. In Fitch's SF Portfolio Credit Model (SF PCM), correlation is driven by sector and geographical concentration of the underlying assets.

Fitch will generally apply a rating cap for transactions where a predominant (>50%) share of the collateral is represented by same sector/same vintage grouping of assets from a single country, with the few exceptions listed on page 4.

Recovery on Defaulted Assets: Recovery rates for defaulted assets are primarily driven by an underlying asset's tranche thickness and seniority within its respective capital structure.

Amortization Impact: Both the default rate and timing are sensitive to the amortization profile of the underlying portfolio. The impact is analyzed in the SF PCM model. Amortization also affects the amount of excess spread in a transaction and availability of principal proceeds to cover any potential interest shortfalls.

CDO Structure and Cash Flow Analysis: CDO structural features and hedging strategies, as well as the timing of defaults and recoveries, have a meaningful impact on CDO performance. Fitch analyzes these factors under the framework described in the Cash Flow Analysis section.

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This report replaces the criteria report entitled "Structured Finance CDOs Surveillance Rating Criteria," dated May 14, 2021.

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Overview

In the absence of material changes, Fitch will conduct a performance review for each transaction at least once every 12 months. In addition to these annual reviews, the existing ratings are subject to interim reviews as described in the Frequency of Reviews section.

Currently, Fitch employs a full-scope cash flow modeling analysis for only a small number of SF CDOs. Some of the analytical elements described in this report are no longer relevant for distressed transactions or for transactions backed by very small and/or highly concentrated portfolios. For those transactions with a majority of the portfolio rated at distressed rating levels, an alternative review process may be followed, as described in the Review of Distressed Transactions section. For transactions backed by small and/or highly concentrated portfolios, a look-through analysis of the individual assets may be used in place of or as a complement to SF PCM. For the remaining transactions, rating reviews will include portfolio analysis generally using SF PCM and structural analysis, which may employ Fitch's Multi-Asset Cash Flow Model (CFM), details of which can be found at <https://www.fitchratings.com/structured-finance/multi-asset-cash-flow-model>.

As part of Fitch's performance review, the transaction is taken to a surveillance committee, where the results of the described methodology are evaluated in detail. However, the final ratings are ultimately assigned by a rating committee that may take into account other qualitative factors. Any transaction-specific variations from the assumptions outlined in this criteria report will be disclosed in the related rating action commentary.

The committee would upgrade or downgrade ratings to full category levels only. For a rating to be upgraded to the next higher category, the model implied rating would have to be equal to or higher than the "+" notching level of the category above. For example, in order to upgrade to 'BBBsf', the model implied rating would have to be 'BBB+sf' or higher.

For a rating to be downgraded, the model implied rating would have to be equal to or lower than the rating category below. For example, in order to downgrade to 'BBBsf', the model implied rating would have to be 'BBB+sf' or lower.

When upgrading or downgrading ratings, the committee would only assign notch-specific ratings if the transaction is subject to a rating cap or credit linked as a result of, for example, counterparty risk or sovereign risk, among others.

Quantitative Models and Assumptions

Fitch's primary tool in assessing key rating factors of SF CDOs is its SF PCM. The model is updated from time to time, and a release log is maintained on the website to indicate the updated features and assumptions. A description of the data used to derive the assumptions of the Fitch SF PCM is described generally above and in more detail within the respective sections discussing the rating factors.

Related Criteria

[Global Structured Finance Rating Criteria \(March 2021\)](#)

[CLOs and Corporate CDOs Rating Criteria \(September 2021\)](#)

[Structured Finance and Covered Bonds Counterparty Rating Criteria \(January 2020\)](#)

[Structured Finance and Covered Bonds Counterparty Rating Criteria: Derivative Addendum \(January 2020\)](#)

[Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria \(November 2020\)](#)

Related Model

[Fitch Portfolio Credit Model](#)

Default Probabilities

Base Assumptions

Fitch uses an asset's individual rating and term to maturity as the primary determinants of that asset's expected default probability.

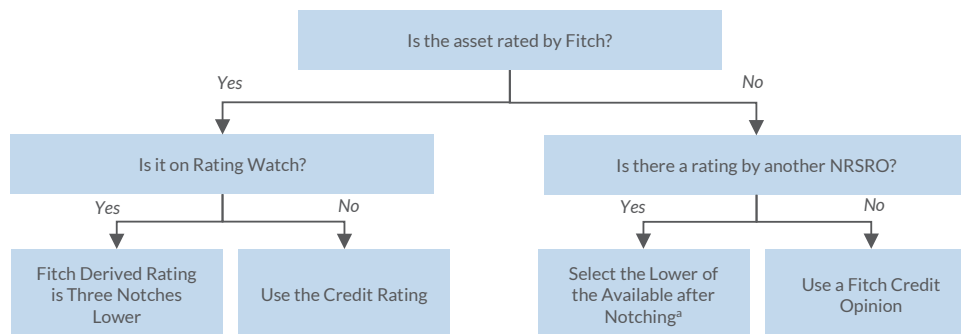
For the default probabilities of structured finance assets, we use the same figures as those used for corporate assets described in the CLOs and Corporate CDOs Rating Criteria. Corporate asset default probabilities are developed from the default data of a wide spectrum of corporate entities spanning several decades and covering several economic cycles, an observation period that is longer than what is available for SF assets. As the confidence levels are based on the probability of defaults, we also use the same confidence levels as those used in the CLOs and Corporate CDOs Rating Criteria.

Corporate asset default probabilities are seen as a good proxy for structured finance default probabilities as the two are comparable other than during the global financial crisis. The lesson from the financial crisis was that structured finance assets are more volatile and highly correlated than corporate assets. To capture this volatility, we apply the correlation stresses described in the next section that increase the portfolio default rates under higher stress rating categories.

Additional Considerations

The approach calls for the use of a Fitch rating where available. Where a particular asset is not rated by Fitch, the lowest of the ratings assigned by other rating agencies will be applied, as shown on the chart below. If an asset carries a Negative Rating Watch, the credit rating will be reduced by an assumed three notches for the purpose of determining the appropriate input default probability.

Fitch-Derived Rating Structure



^aIf a rating is on Rating Watch Negative by any NRSRO, Fitch adjusts the rating down by three notches before selecting the lower of the available ratings.
Source: Fitch Ratings.

For a CREL asset without a public rating, Fitch will assign a credit opinion in accordance with the CMBS criteria outlined in "CMBS Large Loan Rating Criteria." An abbreviated review will be conducted if a CREL asset represents a relatively small proportion of the CDO collateral.

An abbreviated review includes a determination of net cash flow based on a review of the current and historical property operating performance and current rent roll, as applicable; a review of the basic loan terms, as provided by the collateral manager; a determination of the current and stressed refinance debt service coverage ratio; and a determination of the current and stressed loan to value ratio. The ratings would be assigned based on parameters outlined in the CMBS criteria. When updated operating performance is not received, Fitch may make conservative assumptions based on previous performance or assume a 'CCCSf' rating.

For other non-publicly rated assets, Fitch will assume a 'CCCSf' rating unless a higher, or lower, rating is warranted in the analyst's opinion, based on information in the public domain and/or collateral manager discussions.

The SF PCM treats SF bonds rated 'CCsf' and 'Csf' as 'Dsf', consistent with Fitch's annual transition and default studies, which consider bonds at these rating levels impaired or nearly defaulted.

In instances where a sector experiences ongoing volatility with ratings under review, alternative adjustments may apply. In addition, ratings on assets or sectors with a Negative Rating Outlook may be lowered based on discussions with the underlying asset rating groups. Several scenarios with respect to the severity of potential negative migration of the underlying assets with a Negative Rating Outlook may be considered.

Fitch may perform sensitivity testing with respect to other model inputs when considering an upgrade. For example, additional scenarios with an extended weighted average life (WAL) for some assets may be included in the analysis to reflect a heightened extension risk.

Fitch will disclose adjustments described above in its rating action commentaries.

Default Correlation

Although the long-term average annual global SF default rates are expected to be commensurate with those of corporate debt, the SF sector shows greater variability around this annual average, particularly when looking within a single sector. This increased volatility and the clustering of defaults are indicative of the high level of correlation inherent in portfolios of SF assets; it is reflected in the calibration of the SF correlation framework.

Given the typically concentrated nature of SF CDO portfolios, Fitch uses the correlation input to express its credit view on a portfolio concentrated in the worst-performing SF sector, RMBS, and then estimates benefits for diversification across SF sectors and the countries of the assets' origin.

The SF PCM output is defined in terms of the rating default rate (RDR). The RDR varies for rating stress and can be interpreted as the level of portfolio defaults that must be protected against to achieve a particular rating. Therefore, the 'Asf' RDR represents the level of defaults that a note is able to withstand to achieve an 'Asf' rating.

Fitch's credit view is that CDO notes rated 'Asf' or above should be protected against historical peak levels of defaults. Therefore, the SF PCM should produce an 'Asf' RDR level at or above the potential peak.

For the base calibration, Fitch used a 10-year portfolio of 100 'BBBsf' rated assets, all assumed to be from a single SF sector. Fitch's default studies track performance data by cohorts, defined as a static pool of bonds with ratings outstanding at the beginning of the year. For SF bonds, Fitch tracks the impairment rate, which includes a downgrade to a 'CCsf' and lower rating and represents defaults and near defaults. The Fitch framework was established using 70% as the target SF PCM RDR at the 'Asf' rating level for a single-country, single-sector and single-vintage grouping portfolio of 'BBBsf' rated assets. This 'Asf' RDR level implies an 80% correlation of default between a pair of assets from the same-country, same-sector and same-vintage grouping.

While Fitch recognizes that the cumulative impairment rates for the worst-performing SF asset cohorts (CDOs and RMBS) have increased beyond the 70% target, the impairment rates have levelled off.

An upward revision of the target RDR would result in a correlation approaching 100%, treating the portfolio as if it were one asset. This treatment would mask even minimal levels of idiosyncratic risk inherent in the portfolio. While it is appropriate to have high correlation to properly account for high volatility of portfolios concentrated in the same country, sector and vintage, some level of performance differentiation between the assets should remain. The proposed correlation target balances the high degree of the systematic risk present in a concentrated portfolio with protecting subordinate classes against some minimum level of idiosyncratic risk.

With this in mind, Fitch's surveillance methodology will apply a rating cap for transactions where a predominant (>50%) share of the collateral is represented by same-sector/same-vintage grouping of assets from a single country. In such transactions, Fitch will limit the rating of the notes to a maximum of 'BBBsf'. In addition, consideration will be given to portfolios with excessive obligor concentration risk. For example, Fitch will not upgrade the notes above 'BBBsf' when the portfolio comprises fewer than 10 obligors.

This rating cap will not apply to senior notes that are likely to be paid in full within the next year, which are largely covered by cash and eligible investments available in the principal collection account, or in transactions where a look-through analysis of the underlying portfolio supports a higher rating. For example, a look-through analysis of a concentrated CRE SF CDO transaction involves a review of current risk factors of underlying loan pools within CMBS collateral (i.e. underlying loan delinquencies, pool and property type concentrations, etc.), which offers insight into the potential for future losses.

Correlation Framework

SF Base Correlation	Country Add-On	Sector Grouping Add-On	Sector Add-On	Vintage Grouping Add-On ^a	Total Correlation (%)
SF Asset +20%	Same Country +10%	Direct residential real estate exposure +5%	RMBS +15%	Same +30%	80
			Residential REIT +5%	N.A.	40
		Direct commercial real estate exposure +5%	CMBS and CREL +15%	Same +30%	80
			Commercial REIT +5%	N.A.	40
		No direct real estate exposure +0%	Consumer ABS +20%	Same +30%	80
			Commercial ABS +20%	Same +30%	80
			Corporate CDOs +50%	N.A.	80
	Different Country +0%	N.A.	SF CDOs +60%	N.A.	90
			RMBS, CMBS, CREL, Commercial REIT, Residential REIT, Consumer ABS, Commercial ABS +0%	N.A.	20
			Corporate CDOs +50%	N.A.	70
			SF CDOs +60%	N.A.	80

^aVintage grouping add-on is applied to two bonds from the same vintage grouping. Current vintage groupings are: vintage 1 (2010 and later), vintage 2 (2005–2009) and vintage 3 (2004 and prior). N.A. – Not applicable.
Source: Fitch Ratings.

Fitch recognizes the benefit of diversification across countries and SF sectors by lowering correlation between a pair of assets from different countries and sector groups. At each potential level of diversification, Fitch sought to estimate the impact such diversification may have on influencing the peak portfolio default rate. This approach does not seek to predict future peak portfolio default rates, but, rather, it expresses a relative view of diversification benefit. Fitch's correlation framework is summarized in the table above.

Diversification Benefit One: Sector Diversification

Sector diversification recognizes that assets from different sectors show different default statistics due to different risk factors driving the probability of default. The approach divides SF assets into eight broad sectors, as shown in the table below.

Structured Finance Portfolio Credit Model (SF PCM) Categories

1	Residential mortgages, including prime, Alt-A and subprime assets
2	CMBS
3	Consumer ABS (e.g. credit card assets and auto loans assets)
4	Commercial ABS (e.g. trade receivables and equipment leasing assets)
5	Corporate CDOs
6	SF CDOs (tranches from CDOs with exposure to structured finance assets)
7	Real estate investment trusts (REITs)
8	Commercial real estate loans (CREL)

Source: Fitch Ratings.

SF CDOs that have classes from other SF CDOs as underlying assets exhibit increased ratings volatility and clustered default characteristics due to the high level of systematic risk. This is because each individual CDO has diversified its idiosyncratic risk by reducing the level of dependence on any one asset; hence, there is little idiosyncratic risk but significant systematic risk remaining. The high systematic risk implies that these portfolios are driven by the same small number of risk factors and exhibit similar default characteristics during periods of stress. As a result, the target 'Asf' RDR of SF CDOs with exposure to SF CDOs has been set higher than for other asset classes at 87%. This reflects the increased probability of clustered default characteristics due to the high correlation of the assets to similar factors.

CREL are often included in the portfolios of commercial real estate structured finance CDOs (CRE SF CDOs). The CREL exposure may range from senior debt (whole loans or A notes) to some form of subordinate debt (either B notes or mezzanine debt). Senior tranches of CMBS single-borrower transactions are treated as senior CREL debt. Nonsenior tranches of CMBS single-borrower transactions and so-called rake bonds are treated as subordinate CREL debt.

Diversification Benefit Two: Geographic Diversification

Geographic diversification is the most significant portfolio diversification benefit in the SF PCM. A portfolio diversified across countries reduces the correlation among the assets due to different economic risk factors driving the underlying assets. This is reflected in the correlation framework by not including country or sector add-ons. For example, two same-country RMBS assets would have 50% correlation, but two different-country RMBS assets would have only 20% correlation.

It is Fitch's view that the diversification benefit of mixing assets from different countries is greater than the diversification benefit of mixing assets from different sectors. In other words, portfolios of assets from different countries, even if from the same sector, represent lower credit risk than portfolios from the same country of origin diversified across sectors.

Structured Finance and Real Estate Investment Trusts

Commercial real estate investment trust (REIT) debt is often included with SF securities, particularly in CRE SF CDOs. The correlation structure recognizes that REITs, as a corporate industry with primary exposure to real estate markets, are more correlated to SF assets than other corporate industries. The structure also recognizes that some level of diversification benefit can be gained by adding REIT assets to a portfolio otherwise consisting solely of SF securities.

The base correlation between same-country REIT and SF assets is set at 30%. An additional 5% correlation (total 35%) is ascribed between RMBS and residential REITs and between CMBS or CREL and commercial REITs.

The correlation assumption between two residential or two commercial REITs is assumed to be 40%, recognizing that common exposure to residential or commercial real estate markets brings the potential for a higher level of systematic risk than is typical within a corporate industry (intra-industry corporate correlation assumptions typically range from 24%–26%). The correlation assumptions ascribed to REIT sectors not only recognize the potential for higher systematic risk, but also that REIT debt often appears in concentrated portfolios. The default correlation figures are set to penalize for the risk that a concentrated portfolio may exhibit default-rate variability beyond that observed in peak corporate portfolio default statistics.

For a portfolio of 100 'BBBs' rated, 10-year single-country CMBS assets, the 'Asf' rated RDR is 70%. In contrast, the portfolio of 50 single-country CMBS assets and 50 single-country commercial REITs will have an 'Asf' rated RDR at 45%. The decrease in 'Asf' RDR represents the diversification benefit of adding REIT assets to an otherwise CMBS portfolio. The table below shows RDR coverage levels at the 'Asf' and 'AAAsf' rating levels for a sample of portfolios consisting of 100 'BBBs' rated assets with a term of 10 years.

Asf and AAAsf Rating Default Rate Levels for Selected Portfolios

(%, Sample of Portfolios Consisting of 100 BBBsf Rated Assets with a Term of 10 Years)

Portfolio	Geographical Composition	Sector Composition	Portfolio Correlation	Asf RDR Coverage Level	AAAsf RDR Coverage Level ^a
1	Single country	Single sector (RMBS, CMBS, corporate CDOs, CREL or ABS)	80	70	100
2		Single sector (SF CDOs)	90	87	100
3		Equally distributed among three SF sectors	52	40	83
4	Mixed country (equally distributed among three countries)	Single sector (RMBS, CMBS, CREL or ABS)	49	36	74
5	Highly diversified (equally distributed among 10 countries)	Equally distributed among three SF sectors	24	24	49

^aFitch is unlikely to assign ratings in any category where the model rating default rate (RDR) output exceeds 90%.
Source: Fitch Ratings.

The tables below show model RDR and rating loss rate (RLR) output for concentrated portfolios across various credit qualities. Each portfolio consists of 100 10-year assets concentrated in a single sector. The RLRs reflect recovery rate assumptions associated with the sample tranche sizes indicated.

Rating Default Rate — Single-Sector Portfolio

Rating Stress	AAAsf			AAsf		Asf	BBBsf	BBsf	Bsf
	Senior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior
(%)									
Rating Stress	—	>6	0–6	>6	0–6	0–6	0–6	0–6	0–6
AAAsf	62.0	62.0	62.0	88.0	98.0	100.0	100.0	100.0	100.0
AAsf	19.0	19.0	19.0	51.0	79.0	97.0	100.0	100.0	100.0
Asf	2.0	2.0	2.0	10.0	31.0	70.0	99.0	100.0	100.0
BBBsf	0.0	0.0	0.0	2.0	8.0	35.0	90.0	99.0	99.0
BBsf	0.0	0.0	0.0	0.0	0.0	3.0	41.0	80.0	80.0
Bsf	0.0	0.0	0.0	0.0	0.0	0.0	12.0	46.0	46.0

Source: Fitch Ratings.

Rating Loss Rate — Single-Sector Portfolio

Rating Stress	AAAsf			AAsf		Asf	BBBsf	BBsf	Bsf
	Senior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior
(%)									
Rating Stress	—	>6	0–6	>6	0–6	0–6	0–6	0–6	0–6
AAAsf	43.4	52.7	62.0	84.4	98.0	100.0	100.0	100.0	100.0
AAsf	12.4	15.2	19.0	44.4	79.0	97.0	100.0	100.0	100.0
Asf	1.2	1.5	2.0	8.3	31.0	70.0	99.0	100.0	100.0
BBBsf	0.0	0.0	0.0	1.4	8.0	35.0	90.0	99.0	99.0
BBsf	0.0	0.0	0.0	0.0	0.0	2.9	39.3	78.2	78.2
Bsf	0.0	0.0	0.0	0.0	0.0	0.0	11.4	44.2	44.2

Source: Fitch Ratings.

The tables below show model RDR and RLR output for highly diverse portfolios across various credit qualities. Each portfolio consists of 100 10-year assets from three different countries and

three sectors. The RLRs reflect recovery rate assumptions associated with the sample tranche sizes indicated.

Rating Default Rate — Highly Diverse Portfolio

(%)	AAAsf			AAsf	Asf	BBBsf	BBsf	Bsf
	Senior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior
Rating Stress	—	>6	0–6	>6	0–6	0–6	0–6	0–6
AAAsf	10.0	10.0	10.0	18.0	29.0	49.0	80.0	93.0
AAsf	6.0	6.0	6.0	11.0	19.0	36.0	69.0	85.0
Asf	3.0	3.0	3.0	6.0	11.0	24.0	55.0	75.0
BBBsf	1.0	1.0	1.0	4.0	7.0	17.0	45.0	66.0
BBsf	0.0	0.0	0.0	1.0	3.0	8.0	29.0	50.0
Bsf	0.0	0.0	0.0	0.0	1.0	5.0	21.0	39.0

Source: Fitch Ratings.

Rating Loss Rate — Highly Diverse Portfolio

(%)	AAAsf			AAsf	Asf	BBBsf	BBsf	Bsf
	Senior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior	Nonsenior
Rating Stress	—	>6	0–6	>6	0–6	0–6	0–6	0–6
AAAsf	7.0	9.0	10.0	17.2	29.0	49.0	80.0	93.0
AAsf	3.9	5.1	6.0	10.3	19.0	36.0	69.0	85.0
Asf	1.8	2.4	3.0	5.4	11.0	24.0	55.0	75.0
BBBsf	0.5	0.8	1.0	3.0	7.0	17.0	45.0	66.0
BBsf	0.0	0.0	0.0	0.6	2.9	7.9	28.1	48.8
Bsf	0.0	0.0	0.0	0.0	1.0	4.8	20.2	38.4

Source: Fitch Ratings.

Obligor Concentrations

Portfolios with a small number of assets, or those for which individual asset balances represent a disproportionate exposure within the portfolio, carry the risk that portfolio performance may be adversely affected by a few assets that may underperform relative to statistics suggested by their ratings. The basic model framework is already sensitive to obligor concentrations in that, as portfolios contain fewer assets, all else being equal, the portfolio default rate increases.

If a portfolio contains a very small number of assets and/or a very small number of assets represent a disproportionate amount of the overall portfolio balance, a look-through analysis of the individual assets may be used in place of SF PCM or as a complement to the PCM results.

Similar methodology (overlaying SF PCM results with analysis of a minimum number of discreet defaults) may be applied for rating liabilities with ratings lower than underlying asset ratings for portfolios with high correlation. For example, a portfolio with 'BBBsf' rated assets from the same country of origin, same sector and same vintage grouping, resulting in 80% correlation for SF sectors other than SF CDOs and 90% for SF CDOs, would increasingly behave as a single asset, leading to low SF PCM RDRs at 'BBsf' and lower rated levels.

For these levels, SF PCM output may be complemented by the steps described above. Any alternative or sensitivity scenarios will be detailed in transaction-specific rating action commentary.

Portfolio Default Distribution

Using input default probability and correlation assumptions described above, the SF PCM generates a portfolio default distribution. The SF PCM approach is consistent with the corporate PCM approach, which sets target default probabilities for rating stresses in the 'Asf'

and lower rating categories equal to input default probabilities for the same-level rating categories. For the rating categories 'AAAsf' and 'AAsf', target default probabilities are set at levels lower than the input default probabilities because the sample size of data cohorts for the 'AAAsf' and 'AAsf' rated categories contained fewer observations relative to other observed cohorts. Therefore, it is prudent to reduce the target default probability, or raise the threshold, when determining the level of support necessary to achieve high investment-grade ratings. The effect of a lower default tolerance for 'AAAsf' and 'AAsf' ratings is an increase in loss and default assumptions at these ratings.

Recovery Rates

Structured Finance Recoveries

The most appropriate determinant for the recovery of the tranche is its position in the liability structure of its respective transaction (seniority) and thickness relative to the original size of the portfolio (tranche thickness). For pro rata tranches, where losses are attributed proportionally to each tranche, their notional can be aggregated for the purpose of calculating the tranche thickness used in the recovery calculation. A tranche may be classified as senior only if it is the most senior tranche in a structure or pro rata to the most senior tranche in a structure. A security will not be considered senior if there is an unfunded portion of the asset portfolio ranking senior to the security.

Fitch developed recovery assumptions based on the relationship found between these two factors and recovery estimates observed across Fitch-rated distressed SF bonds. For the senior category, Fitch assumes 65% recovery for rating stresses at 'Bsf' and below, which are then tiered down to 50% at the 'BBBsf' stress and 30% at the 'AAAsf' rating stress, as seen in the below table.

For the nonsenior categories, Fitch considers two groupings — thin tranches with a tranche size between 0% and 6% and thick tranches with a tranche size larger than 6%. The assumption for nonsenior thick tranches is 45% for rating stresses at 'Bsf' and below; for nonsenior thin tranches, it is 5% for the stresses at 'Bsf' and below. These standard recovery assumptions are applied in the SF PCM when a senior tranche does not default in a given scenario. A zero recovery is assigned to a bond in the portfolio if its senior tranche defaults in a given scenario. See the Liability Structure and Recovery Rates section below for further explanation.

Recovery Assumptions

Seniority	Tranche Size (%)	Rating Stress (%)					
		AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
Senior ^a	—	30	35	40	50	60	65
Nonsenior	>6	10	15	20	25	40	45
Nonsenior	0-6	0	0	0	0	5	5

^aSenior is defined as the most senior tranche in a structure or a pro rata to the most senior tranche.
Source: Fitch Ratings.

Liability Structure and Recovery Rates

The repayment of interest and principal in SF assets is typically sequential, meaning the most senior tranches are paid first. Likewise, losses are typically allocated in a reverse-sequential order. Therefore, when a tranche defaults, it is highly likely that all tranches ranking junior to it will have experienced a complete loss.

The SF PCM takes the reverse-sequential loss feature of SF securities into account. In each scenario of a given simulation, the SF PCM calculates whether a tranche has defaulted and applies the appropriate recovery level using the assumptions from the Recovery Assumptions table above. The model also calculates whether a senior tranche would have defaulted in the particular scenario. If a senior-ranking security defaults, a 0% recovery is assigned to the tranche.

This liability structure feature is applied for all assets, even when only one tranche from an SF transaction is included in the asset portfolio. This is done automatically by the model, as it compares the rating of the tranche with the default threshold drawn in each scenario. For each

scenario where the asset defaults, the recovery rate applied is determined by one of two possible cases:

- The tranche defaults, and a senior-ranking security does not default, in which case, the relevant recovery rates shown in the Recovery Assumptions table are applied.
- The tranche defaults, and a senior-ranking security also defaults, in which case a 0% recovery rate is applied.

Effective Recovery Rate

Owing to the feature described above, the effective recovery rate for an SF portfolio can differ from those presented in the table above. The extent to which it will differ depends on two factors —the credit quality of the portfolio assets and the rating stress scenario. Lower credit quality assets increase the probability of default. A higher probability of default also increases the likelihood that a senior security would default.

The rating stress also plays a role in determining the portfolio's effective recovery rate. Higher rating stresses result in higher portfolio default rates. The higher portfolio default rate increases the number of assets for which the test of a senior asset defaulting will be performed. This effectively increases the number of instances in which a 0% recovery will be assumed and decreases the effective portfolio recovery rate. The tables below illustrate the effective recovery rate for portfolios of two different credit qualities (BBBsf and AAsf), each consisting of 100 single-sector, single-country assets.

10-Year BBBsf Portfolio Effective Recovery

(%)		Rating Stress					
Seniority	Tranche Size (%)	AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
Senior	—	45.0	55.0	60.0	70.0	80.0	80.0
Nonsenior	>6	0.7	7.8	28.6	42.9	63.3	65.0
Nonsenior	0–6	0.0	0.0	2.9	8.0	13.3	15.0

Source: Fitch Ratings.

10-Year AAsf Portfolio Effective Recovery

(%)		Rating Stress					
Seniority	Tranche Size (%)	AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf
Senior	—	45.0	55.0	60.0	70.0	N.A.	N.A.
Nonsenior	>6	10.2	25.5	40.0	55.0	N.A.	N.A.
Nonsenior	0–6	0.0	0.0	3.0	10.0	N.A.	N.A.

Source: Fitch Ratings.

Real Estate Investment Trust and Commercial Real Estate Loan Recovery Rates

REIT debt is assigned standard corporate recovery rate assumptions, described in Fitch Research on “CLOs and Corporate CDOs Rating Criteria.”

Senior CREL debt refers to the senior-most mortgage claim on a single property or a group of properties owned by a single borrower. The recovery rate assumptions applied to senior CREL are shown in the table Recovery Assumptions. However, since CREL recovery rate expectations can vary depending on leverage, typically measured by the loan-to-value ratio, property quality, property type and location, there may be instances where an asset-specific recovery rate is assumed in place of a standard recovery rate assumption.

Subordinate CREL debt on a property or group of properties is a junior mortgage claim or a mezzanine loan and is typically a thin slice relative to the overall debt secured on the property. Importantly, it is subordinate in terms of loss allocation. As such, the recovery rate assumptions for subordinate CREL are based on the size of the debt relative to the overall debt secured on the property. The recovery rate assumptions applied to subordinate CREL are shown in the table, Recovery Assumptions. As with SF assets, in each scenario where a subordinate CREL

asset defaults, the model tests whether a senior-ranking asset would also have defaulted, in which case, a 0% recovery rate is applied.

Amortization of the Underlying Assets

Portfolio default rate and timing are influenced by the amortization profile of the underlying assets. In general, a portfolio with a shorter average life will have a lower rate of default and more frontloaded default timing than a similar sector- and credit quality-composed portfolio with a longer average life. While faster amortization benefits a transaction via a lower default rate, this is offset by the lower amount of excess spread available over the life of the transaction.

For U.S. SF CDOs and CRE SF CDOs, Fitch uses the WAL or expected maturity dates as reported by the trustee, supplemented with additional market data.

For European SF CDOs, the agency would apply an extension scenario, based on a time to maturity assumption for the portfolio determined as follows. For underlying assets that are not currently amortizing and for CMBS and CREL, Fitch will derive the asset bullet maturity as shown in the table below. Otherwise, a bullet average maturity date for currently amortizing assets will be derived by assuming a linear amortization between the analysis date and the assumed maturity date as determined based on the table. The calculated WAL will be floored at the WAL of the asset as reported by the trustee and subject to a maximum at the legal maturity of the asset. CMBS and CREL assets are always modelled assuming the maturity date determined from the table, without a floor or a maximum date.

European SF CDOs Maturity Extension

Sector	Estimated Time to Maturity from Issue Date of Underlying Asset
ABS	5 years
RMBS	25 years
SME/CLOs	10 years
SF CDO	25 years
CMBS	Legal maturity date
CREL	Legal maturity date extended by five years

Source: Fitch Ratings.

The derived bullet maturity will be used in the asset analysis in SF PCM. In the cash flow modelling, Fitch may model the assets assuming an amortization profile equivalent to the derived WAL for those assets where there is evidence they are amortizing, in cases where modelling bullet maturities may cause the most senior notes to not pay timely interest.

Cash Flow Analysis

Fitch's modeling analysis is based on the actual portfolio characteristics as of that time. The purpose of Fitch's cash flow analysis is to determine, based on the outputs of SF PCM and the defined stress scenarios, whether a given class in the SF CDO structure will receive principal and interest in accordance with terms of the transaction documents.

Fitch's CFM reflects how the various stress scenarios affect principal and interest proceeds as they are received from the underlying collateral portfolio through the life of a transaction. The CFM then allocates those payments to the various classes of notes, based on the transaction structure as detailed in the underlying documents. If the CFM shows that a particular class of notes has received principal and interest payments according to the terms and conditions of the notes under the stress scenario for a particular rating, then it is deemed to have passed that particular stress scenario.

Fitch uses a proprietary Excel-based CFM, the Multi-Asset Cash Flow Model, which is described in detail at <https://www.fitchratings.com/structured-finance/multi-asset-cash-flow-model>. The CFM is customized for each transaction based on the transaction documents provided to Fitch by the issuer, originator or third-party agents on their behalf. Fitch's CFM is not publicly available.

The outcome of the cash flow modeling analysis is a key factor in determining the final rating for each note in the structure. The rating committee considers the relevance of each scenario in the context of the rating level, time horizon and a degree of failure. Fitch's rating committee may decide to put more weight on results in certain scenarios or accept a small numerical tolerance for a given scenario, depending on a transaction's collateral or structural characteristics. For example, in the case of a transaction with an all-floating liability structure and an all-fixed underlying portfolio, Fitch may place more weight on the interest rate up scenarios to more accurately reflect the risk of payment shortfalls.

Default Timing and Interest Rate Stress Combinations

Fitch's cash flow modeling analysis includes up to nine stress scenarios, consisting of three default timing curves and three interest rate scenarios designed to test the impact of the interest rate environment, as described in Fitch Research on "Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria."

Timing of Defaults

Fitch will typically apply three different default timing scenarios, as described in the "CLOs and Corporate CDOs Rating Criteria."

In addition, most of the outstanding SF CDO portfolios are expected to have a relatively short remaining WAL. Consequently, even in the backloaded default timing scenarios, distribution of defaults would become compressed. Depending on transaction characteristics, Fitch may adjust the applied default patterns to account for the specifics of the analyzed portfolio (for example, in instances when a portfolio has a very short remaining life or an accelerated amortization profile).

Treatment of Distressed and Defaulted Securities

Defaulted assets are included in the SF PCM model and given standard default and recovery expectations. Specifically, the SF PCM defaults such assets in year one and assigns recoveries, as described in the Liability Structure and Recovery Rates section. The defaulted assets are also included in the cash flow model along with the rest of the portfolio.

Fitch assumes a timing lag for defaulted asset recoveries in the cash flow model. Principal recoveries are typically realized through periodic principal redemptions made through the remaining life of the defaulted bond. This timing is replicated in the cash flow model by assuming a recovery lag equal to each SF CDO's portfolio WAL and will vary for each transaction.

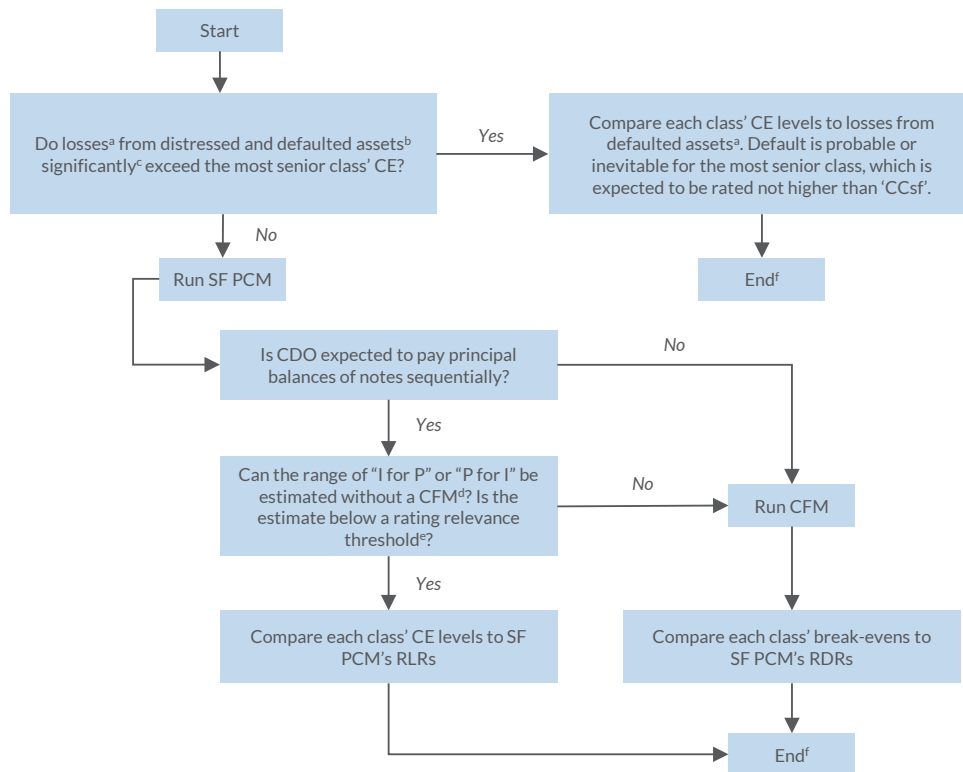
Review of Distressed Transactions

Currently, Fitch employs a full-scope cash flow modeling analysis for only a small number of SF CDOs. Some of the analytical elements in Fitch's rating framework described above are no longer relevant for distressed transactions. The analytical scope is determined as described by the decision tree on the following page.

Generally, cash flow modeling will be performed when the transaction's level of excess spread surpasses a rating relevance threshold and cannot be estimated without a cash flow model analysis within the context of the note's expected remaining life. This decision is ultimately confirmed by a credit committee that evaluates the robustness of the analysis presented.

Fitch will neither use the SF PCM to project losses from the portfolio nor conduct cash flow model analysis to analyze the impact of CDO structural features and cash flow timing when the most senior class of notes is expected to suffer a first-dollar loss stemming from the distressed assets alone.

Decision Process for a Rating Review Scope



^aUsing asset-specific or standard recovery rate assumptions for assets with a Fitch-derived rating for 'CCsf' and lower.

^bAssets with a Fitch-derived rating of 'CCsf' and lower. ^cSignificance is determined in the context of available interest for principal (if any), i.e. when the gap between expected losses from defaulted assets and most senior class' CE clearly exceeds even the high end of potential interest for principal. ^dBased on the trends from most recent payment reports combined with anticipated changes in a transaction's interest rate swap schedule, portfolio amortization and interest shortfalls from underlying assets. ^eFor interest for principal ("I for P"), rating relevance threshold is defined in relation to the level of incremental CE from "I for P" required to move a rating up by at least one category. For example, with a bond with a 'BBsf' level CE, is the estimated cumulative future "I for P" commensurate with a difference between a 'BBsf' and 'BBBsf' SF PCM RLRs? For principal and interest ("P and I"), rating relevance threshold is determined by the level of CE erosion from P for I required to move a rating down by at least one rating category. For example, for a bond with a 'BBsf' level CE, is the estimated cumulative future P for I commensurate with a difference between the bond's CE and 'BBsf' level of SF PCM RLRs? When a CDO is expected to switch from "P for I" to "I for P" in the future, the net effect (if it can be estimated) is evaluated. ^fThis chart does not include potential further qualitative adjustments recommended by a credit analyst and credit committee.

Source: Fitch Ratings.

When the expected losses from the distressed assets (those rated 'CCsf' and lower) already significantly exceed the credit enhancement (CE) level of the most senior class of notes, projecting future defaults on a remaining balance of performing assets and analyzing the impact of structural features provide little analytical insight. In this case, Fitch will not perform SF PCM and cash flow model analysis. The loss is considered to significantly exceed the most senior class' CE level when the gap between them exceeds any potential cumulative benefit of interest proceeds expected to be diverted from subordinate notes to the most senior class due to the operation of the structural features of the CDO. In such transactions, Fitch will determine the appropriate ratings, which are unlikely to exceed 'CCsf', based on the relationship of the losses from distressed assets and each class' CE level.

For classes in which the CE level exceeds the expected losses from distressed assets but is lower than the losses projected at the 'CCCsf' rating stress under Fitch's SF PCM analysis, Fitch will consider the notes to be at a 'CCsf' level. For classes in which the amount of expected losses from the distressed and defaulted assets in the portfolio already exceeds the CE level, Fitch will consider the notes to be at a 'Cs' level.

Rating Assumption Sensitivity

Two hypothetical portfolios were created with varying compositions to test rating sensitivity against the key rating drivers.

Fitch will review the impact on the rating for the following stresses:

- Default probability multiplier of 125%, and recovery rate multiplier of 50%.
- Default probability multiplier of 150%, and recovery rate multiplier of 50%.
- Default probability multiplier of 125%, and recovery rate multiplier of 75%.
- Default probability multiplier of 150%, and recovery rate multiplier of 75%.
- Default probability multiplier of 125%, and correlation multiplier of 112.5%.
- Default probability multiplier of 150%, and correlation multiplier of 112.5%.

The tables below show the sensitivity results for two example portfolios. The analysis is only based on the asset performance, excluding structural features and cash flow modeling.

Portfolio One

- Geographic location: U.S.
- 100 equally weighted assets.
- 'BBB' rated assets.
- 100% nonsenior thin tranche.
- 10-year maturity.
- Sector: RMBS (33%), CMBS (33%), Commercial ABS (34%).

Initial Rating	Base RLR (%)	Indicative Rating					
		125% x PD; 0.5 x RR	150% x PD; 0.5 x RR	125% x PD; 0.75 x RR	150% x PD; 0.75 x RR	125% x PD; 112.5% Base Correlation	150% x PD; 112.5% Base Correlation
AAAsf	84.0	AA+	AA	AA+	AA	AA	AA-
AAsf	63.0	AA-	AA-	AA-	AA-	A+	A
Asf	40.0	A-	BBB+	A-	BBB+	BBB+	BBB
BBBsf	28.0	BBB-	BB+	BBB-	BB+	BB+	BB+
BBsf	7.6	BB-	B+	BB-	B+	BB-	BB-
Bsf	1.9	B-	CCC	B-	B-	B	B

PD – Probability of default. RR – Recovery rate.
Source: Fitch Ratings.

Portfolio Two

- Geographic location: U.S. (50%), UK (50%).
- 50 equally weighted assets.
- Asset quality: 'B+' (24%), 'B' (24%), 'B-' (24%), 'CCC' (28%).
- 100% senior.
- Five-year maturity.
- 100% RMBS.

Initial Rating	Base RLR (%)	125% x PD; 0.5 x RR	150% x PD; 0.5 x RR	125% x PD; 0.75 x RR	150% x PD; 0.75 x RR	125% x PD; 112.5% Base Correlation	150% x PD; 112.5% Base Correlation
AAAsf	70.0	BBB-	BB+	A+	A+	AAA	AAA
AAsf	65.0	BB+	BB+	BBB+	BBB+	AA	AA
Asf	58.8	BB+	BB	BBB-	BBB-	BBB+	BBB+
BBBsf	46.0	B+	B	BB+	BB	BB+	BB+
BBsf	27.2	CCC	<CCC	B-	CCC	B+	B+
Bsf	18.2	<CCC	<CCC	<CCC	<CCC	CCC	CCC

Source: Fitch Ratings.

Binary Risk

Rating volatility could increase as the pool size contracts over time and/or as the transaction nears the end of its expected term. Multiple category upgrades are harder to predict and may arise when an underperforming bond has a higher than expected recovery and/or when a manager buys it out of the pool.

For example, if an underlying CMBS pool has defeased collateral with a long-dated maturity and the pool size becomes smaller as a result of greater than expected recoveries on dispositions, multiple category upgrades to the underlying bond are possible because the defeased collateral would then represent a greater proportion of the pool.

Frequency of Reviews

Fitch typically reviews each transaction on an annual basis. However, there are several factors that may cause the need for an interim review:

- A change, if any, in critical CDO counterparties or collateral manager, counterparty downgrade or default.
- Acceleration or liquidation of a transaction.

Criteria Disclosures

In subsequent rating action commentaries related to surveillance actions, Fitch expects to disclose the following:

- Rating adjustments for a sector that experiences ongoing volatility with ratings under review.
- Lower ratings applied to assets or sectors with Negative Rating Outlook based on discussions with the underlying asset rating groups.
- Sensitivity scenarios when considering an upgrade to address potential life extension or concentration.
- Alternative scenarios when a CDO portfolio has unique characteristics.
- Alternative recovery assumptions, when the impact is material.
- Any variations to criteria.

Variations from Criteria

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. 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.

Limitations

Ratings, including Rating Watches and Rating Outlooks assigned by Fitch, are subject to the limitations specified in Fitch's Ratings Definitions.

Data Sources

Assumptions for the correlation impact are informed by historical performance of cohort structured finance products. Recovery assumptions are informed by observed recoveries. The decision to use corporate asset default probabilities for structured finance assets is based on comparisons of historical defaults of both. Fitch used data from Trepp, LLC and Intex Solutions, Inc. along with its own data when calculating historical performance.

The above data in conjunction with analytical judgement serve as a basis for developing and validating the default, correlation and recovery assumptions utilized by this criteria report and the SF PCM. Fitch reviews the data to determine the need to update the assumptions at least annually.

The ratings above were solicited and assigned or maintained at the request of the rated entity/issuer or a related third party. Any exceptions follow below.

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Global Structured Finance Rating Criteria

Master Rating Criteria

Scope

These criteria provide an overarching framework applicable to all new and existing structured finance (SF) transaction note ratings globally, including residential and commercial mortgage-backed securities (RMBS and CMBS, respectively), asset-backed securities (ABS) and structured credit ratings. Any detailed asset class-specific rating criteria published by Fitch Ratings should be considered in addition to these criteria.

Key Rating Drivers

Each of the key rating drivers below is of equal importance for the analysis.

Asset Isolation and Legal Structure: SF transactions are structured to isolate, or “de-link,” an underlying pool of assets from the corporate credit risk of the original owner, or “originator”, of those assets. This is intended to ensure that the transaction’s main credit risk relates to that of the pool of assets, rather than the idiosyncratic credit risk of the originator. In the absence of other factors, the effective isolation of the assets from the credit risk of the originator can allow SF securities to achieve a rating higher than that of the originator.

Asset Quality: Fitch analyses the assets’ credit characteristics to derive a loss expectation under a base-case scenario. This assumption is stressed further in each successive rating category, so that securities rated in the high investment-grade categories (ie ‘AAA’sf’ and ‘AAAsf’) have loss expectations that are consistent with remote, high-severity stress scenarios.

Financial Structure: Credit enhancement and structural features are key considerations in the assessment of the financial structure. Fitch’s rating for each bond reflects whether there is sufficient credit enhancement available to withstand potential losses given default on the underlying collateral pool in the relevant rating stress scenario. Fitch will analyse the structural features, including the bond repayment structure.

Counterparty Risk: Fitch’s analysis relies on all SF counterparties having the operational knowledge and capability to perform the functions that they are contractually obliged to perform. Fitch analyses any counterparty dependencies, such as provisions for derivatives, bank accounts, or financial guarantees, as these represent operational exposures and/or credit exposures beyond the securitized asset pool.

If sufficient isolation from any material credit or operational risk introduced by a counterparty is not achieved, the SF bond’s rating may not exceed that of the counterparty introducing that risk.

Operational Review: The originator, servicer and CDO asset manager, as transaction participants, can affect the performance of the underlying assets and, ultimately, the SF transaction. Where applicable, Fitch reviews the operational processes for each originator, servicer or asset manager participating in the rated SF transaction.

Rating Caps: Fitch may view certain characteristics of SF transactions to be incompatible with certain rating categories and therefore applies rating caps as described in *Appendix 4*.

This report updates and replaces the [Global Structured Finance Rating Criteria](#) report published 24 March 2021.

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Click Here for Rating Criteria Synopsis Video



Disclaimer: This synopsis video is a summary of the criteria report made for information purposes only. It does not replace any part of the criteria report and is to be used only as complimentary material.

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>. In addition, ratings within the scope of these criteria are subject to the following specific limitations:

Fitch's rating analysis is based upon the prevailing relevant legal framework and generally does not address the impact of unforeseen changes to the law (including taxation related legislation). Changes to the law are analysed as credit events as outlined in the *Surveillance* section of this report. The implementation of a previously unforeseen change in the law may have an impact on assigned ratings. Where the relevant legal framework is not considered sufficiently robust, Fitch may apply a rating cap or may not assign a rating at any level (see a discussion of this and other reasons for capping and limiting ratings in *Appendix 4: Rating Caps and Limitations*).

Specifically regarding special-purpose vehicles (SPVs), Fitch's rating analysis does not address the risk of a vexatious or nuisance challenge, the potential for a change in the legal or tax regime and fraud.

Assessment of asset quality (including portfolio and data adequacy), robustness of financial structure, operational risks, sovereign dependency, counterparty aspects or specific legal structure issues may prevent Fitch from rating a transaction, or may limit the highest achievable ratings in the agency's analysis. The core areas where such restrictions may apply are generally those detailed in *Appendix 4: Rating Caps and Limitations* and in Fitch's [Structured Finance and Covered Bonds Country Risk Rating Criteria](#).

Asset Isolation and Legal Structure

In its analysis of new SF transactions, Fitch reviews whether the following principles are adequately integrated in the transaction structure.

The distinguishing feature of an SF transaction is the isolation, or "de-linking", of an underlying pool of assets from the corporate credit risk of the original owner, or "originator", or "asset manager" of those assets. The aim is that the primary credit risk of the transaction relates to that of the pool of assets themselves rather than the idiosyncratic credit risk of the originator. Except where and to the extent set out in the asset class-specific criteria, this is typically achieved in SF by the sale of an identifiable and specific pool of assets, either directly or indirectly, to an SPV so that neither the assets nor their proceeds will be clawed back as part of the insolvency estate of the originator or seller in the event of its insolvency.

The SPV typically issues debt and uses proceeds of that issuance to acquire cash-generating assets (or charged assets in the case of funded synthetic transactions). The SPV passes through cash it receives from the assets to pay interest on the debt and, in most cases, to amortise (fully or partially) the SPV's debt. An example of one exception to this is synthetic transactions that may not issue debt but provide for an unfunded exposure to reference assets (see *Appendix 5*).

SPVs are often described as "insolvency remote" in that the risk of the transaction being disrupted by the insolvency of the originator of the assets, or the parent of the SPV, is rendered a remote risk through various structural features. Unlike operating companies, SPVs are restricted by their formation and transaction documents and do not have the ability to borrow or raise capital to remedy cash flow shortfalls or asset, security or transaction structural problems. Legal restrictions on an SPV limit the business activities it is allowed to undertake. Therefore, the transaction is protected as far as possible from credit risks posed by any ancillary activities that an SPV could otherwise undertake unrelated to the transaction.

As their name suggests, SPVs for SF transactions are established for a specific and limited purpose, namely for issuing the SF notes, and have a separate and independent legal existence from their parents. The SPV therefore provides improved predictability of outcome relative to corporate credit, as the risk factors associated with an SF transaction are confined primarily to the asset pool transferred to the SPV.

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Related Criteria

[Exposure Draft: Structured Finance and Covered Bonds Counterparty Rating Criteria \(September 2021\)](#)

[Structured Finance and Covered Bonds Counterparty Rating Criteria \(January 2020\)](#)

[Exposure Draft: Structured Finance and Covered Bonds Counterparty Rating Criteria: Derivative Addendum \(September 2021\)](#)

[Structured Finance and Covered Bonds Counterparty Rating Criteria: Derivative Addendum \(January 2020\)](#)

[Structured Finance and Covered Bonds Country Risk Rating Criteria \(February 2020\)](#)

[Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria \(September 2021\)](#)

[Non-Performing Loan Securitisations Rating Criteria \(December 2019\)](#)

Fitch assigns ratings to a variety of transactions using many different legal forms of SPVs. The legal form of organisation will be regulated by local law in the jurisdiction where the SPV was created and determined by the sponsor. An SPV in an SF transaction is typically a limited liability company, a trust, limited liability partnership, or other form of body corporate (depending on the local law in the place of establishment). Fitch's analysis of insolvency remoteness and the principles applied are detailed in *Appendix 1* of this report.

This analysis will not be repeated during the life of the transaction unless any material change is identified.

Legal Opinions and Transaction Documents

The SPV formation documents, the documents relating to a particular transaction, and associated legal opinions indicate the extent of the separation of the assets from insolvency risk of the seller and the robustness of the structure of a particular transaction and, consequently, the extent of de-linkage of the assets from the transferor and the SPV from affiliates.

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 following with respect to the enforceability of the transaction documents: (i) the laws of the jurisdiction(s) where each relevant SPV, and certain other transaction parties, are formed/incorporated; (ii) the laws governing the transaction documents; and (iii) the laws governing the transfer of the assets, except where and to the extent set out in the asset class-specific criteria.

It should be noted that any or all of the relevant laws may be different; and Fitch expects legal opinions to cover all relevant laws. This practice may vary for certain jurisdictions related to National Scale ratings. Except where and to the extent set out in the asset class-specific criteria, legal opinions are expected to address the nature of the various transfers in the transaction and provide assurance that the assets transferred to the SPV (i) are not subject to be recovered or "clawed back" by the seller of the assets in the event of the insolvency of the seller of such assets to the SPV, and (ii) will not be consolidated with the assets of the parent or other controlling party upon the occurrence of the insolvency of such party (nor will the SPV itself be consolidated with such party in the event of that party's insolvency).

Except where and to the extent set out in the asset class-specific criteria, Fitch also expects opinions to address the enforceability (including in the event of insolvency of any of the relevant parties) of the transfer of related security interests, if any, between the transferors and transferees, including but not limited to, any security interest in favour of the indenture trustee or security trustee.

General corporate and enforceability opinions indicate that the duties and obligations imposed on, and the agreements executed by, the issuer and other relevant parties are valid and binding, and enforceable against the issuer (and such other parties) in accordance with their terms. Tax opinions or memoranda address the status of the issuer (and any other relevant parties) in the transaction and, in certain circumstances, indicate whether such entity will be liable for payment of taxes, and if so, quantifying such amounts. Legal opinions should also address other matters relevant to a particular asset class, as set forth in the criteria for such asset class.

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.

Asset Quality

Asset Classes

SF transactions are collateralised by a broad spectrum of financial assets. Mortgage loans secured by residential and commercial properties, consumer assets, such as credit card receivables, unsecured loans and auto loans, and corporate loans and securities are the most common assets that are securitised. Fitch classifies SF transactions into four main sectors: RMBS, CMBS, ABS and Structured Credit. Within these sectors, there is a variety of subsectors, such as the ABS sector encompasses consumer (e.g. auto loans, credit cards, unsecured loans and student loans) and commercial assets (e.g. aircraft leases, franchise loans, and corporate-linked future flows), as well as asset-backed commercial paper (ABCP) conduits.

See Fitch [sector-specific criteria and bespoke criteria](https://www.fitchratings.com) available at www.fitchratings.com.

Default and Loss Analysis

Repayment of principal and interest on the underlying loans and collateral are used to service and repay the rated notes in SF transactions. Fitch typically analyses the assets' credit characteristics to derive a loss expectation under a scenario that reflects Fitch's macroeconomic expectations. This is commonly referred to as the base-case or expected case scenario, and it is assessed at rating committees or in the preparation of sector-specific or bespoke criteria. The base-case scenario describes expected asset losses only, without reflecting potential loss-reducing structural features of the transaction. Fitch's opinions regarding base case loss expectations are considered by a rating committee, typically based on values derived by one of the approaches listed below.

- Assigning a default probability and loss severity or recovery rate to each individual loan based on loan-level characteristics using the output of rating models as a basis for committee discussion. The underlying pool's loss rate is calculated using default and loss severity or recovery rate models or loan loss models. This approach is typically used in the analysis of RMBS and US CMBS multi borrower transactions.
- Analysing the asset portfolio based on the originators' historical performance for a rating committee to derive an expected loss. This approach is often used in the rating of consumer ABS transactions.
- Assigning default probabilities and recovery rates on the basis of ratings, credit opinions or bank internal rating systems (for granular portfolios only) for individual assets. This approach is most commonly applied in structured credit transactions.

In addition to deriving a base case, loss expectations are generated under increasingly severe assumptions. The loss expectation is higher for each successive rating category above 'Bsf', such that securities are rated in the high investment-grade categories (i.e. 'AAAsf' and 'AAsf') only if they have sufficient credit enhancement to be insulated from loss expectations that are consistent with higher stress scenarios.

Fitch employs a forward-looking rating philosophy that seeks to take a "through-the-cycle" rating approach in the higher rating scenarios and an expectations-based approach at the lower rating scenarios; that is, at the higher rating scenarios, the loss assumptions are expected to reflect a remote stress scenario that stays stable over time, while the lower rating scenarios reflect assumptions that are more closely related with expectations of collateral performance formed at that time. Fitch's 'AAAsf' and 'AAsf' ratings denote the lowest or very low relative default risk, and repayment capacity is unlikely to be adversely affected by foreseeable events.

Loss expectations at the higher rating categories are often expressed as a multiple of the base case loss estimate. For instance, an asset pool may be expected to experience 2% losses in a base case scenario, but in a 'AAAsf' stress scenario, the collateral pool would be expected to withstand losses 5.0 times (x) greater than the base case, or 10% of the collateral pool's balance. If the base case then changed in line with expectations to 2.5% losses, the 'AAAsf' losses may not change as much as the 'Bsf' losses and, for some sectors, may remain near 10% as the multiple applied would decrease to 4.0x.

Fitch typically analyses credit characteristics to derive a loss expectation that reflects a highly probable outcome if conditions remain within expectations, commonly referred to as the base-case scenario.

For granular asset classes with homogenous portfolios, such as RMBS and consumer ABS, Fitch applies deterministic multiples. For asset classes with less granular portfolios (but not single-asset or very concentrated large-loan pools) or portfolios that show sector concentration and where asset correlation is assumed to be less than 100%, Fitch applies a stochastic approach based on a Monte Carlo simulation correlation model to determine the appropriate multiples for higher rating scenarios.

As an example of the calibration of rating default assumptions within sector-specific criteria, the report [CLOs and Corporate CDOs Rating Criteria](#), outlines how Fitch calibrated its CDO methodology by benchmarking model outputs to peak observed default rates. Specifically, the default model was calibrated to reflect the view that CDO notes rated in the 'Asf' category and above should perform well in a stress with similar severity as the recession that generated the peak default rates, with little vulnerability to default. In other words, the calibration was designed so that the protection afforded CDO notes rated in the 'Asf' category and above was at or above historical peak default rates.

While the majority of SF transactions are backed by a granular pool of assets, others are backed by more concentrated pools (for example, collateralised loan obligations and CMBS). Furthermore, some transactions are not fully reliant on a pool of assets for their credit quality but are credit-linked to underlying entities or guarantee providers. These underlying entities include single-name corporate entities, financial institutions, municipalities, sovereign entities, and financial guarantors.

Where structures are not backed by a single entity or a diversified pool of assets, but have a concentrated pool with several large exposures, historical default data can become less relevant. This can also occur with formerly granular pools that become concentrated over time as they amortise approaching maturity. Fitch will employ certain deterministic stresses to evaluate whether the pool is overly exposed to these large exposures' default risk. Many asset classes use concentration matrices that lead to Fitch assuming that one or several of the large exposures within the pool defaults. The number of defaulted exposures will depend on the rating level analysed.

While Fitch assigns long-term ratings to most SF notes, some SF ratings are assigned on a short-term scale. Where short-term ratings are assigned, Fitch either publishes specific criteria, for example, for asset-backed commercial paper, or uses assumptions for the short-term ratings that are in line with assumptions for the commensurate long-term ratings in its sector-specific or bespoke rating criteria. Which long-term rating stress is applied is based on the relationship between short- and long-term Fitch ratings for corporate and public finance. For cases where more than one long-term corporate or public finance rating is associated with a single short-term rating, Fitch applies the rating stresses associated with the highest long-term rating.

The sector-specific or bespoke criteria may include a specific treatment applied when short-term ratings are assigned.

Data Adequacy

Fitch derives its SF rating criteria assumptions with reference to data specified in sector-specific or bespoke rating criteria. The adequacy of such data will also be described in the sector-specific or bespoke rating criteria along with any limitations in data adequacy that have led to a rating cap in that sector.

As part of the transaction analysis, where applicable, Fitch expects to receive originator-specific historical performance data relevant to the securitised asset pool for the longer of the following: (a) five years; and (b) a period covering all phases of at least one economic cycle. If sufficient originator-specific information is not available, significant market-wide historical performance data covering at least the same timeframe may often provide proxy information. This would be the case, in particular, for asset classes where the originator information may provide a limited contribution to the expected asset performance (for example, assets originated for the syndicated loan market).

Certain SF transactions are not reliant on a diversified pool of assets; some may be credit-linked to underlying entities or guarantee providers, while others are backed by more concentrated pools.

Fitch performs a cash flow analysis to assess the financial structure, especially where derivatives are embedded or where there is a material reliance on excess interest.

Financial Structure

Credit Enhancement

Credit enhancement is a key component in SF as it is the mechanism that provides bondholders with protection from losses on the underlying pool. Fitch's ratings for each bond reflect whether the bonds have sufficient credit enhancement available to withstand default given losses on the underlying collateral pool that Fitch expects under the rating stress scenario associated with the relevant bond rating. Credit enhancement can be sourced internally by means of subordination, excess interest, or overcollateralisation (OC) or externally by a third-party provider in the form of a financial guarantee, the provision of a reserve fund account, external equity, or a combination of the above. Credit-linked SF transactions typically do not have additional credit enhancement; rather, the rating is dependent on the underlying entity or guarantee provider.

Structural Features

Fitch's approach to analysing the various structures is described in asset-specific or cash flow criteria reports. Cash flow modelling will reflect the structure of the transaction concerned in assessing the adequacy of credit enhancement at each rating level. Fitch will generally customise the cash flow model to reflect any structural features that are not part of the base model. However, Fitch may not model certain structural features if the agency deems them to have an immaterial impact under the relevant ratings stress scenarios. Cash flow criteria include a number of stress assumptions that are applied at different rating levels. Stresses may include, but are not limited to:

- high and low prepayment stresses;
- asset coupon compression to stress revenue levels;
- front- or back-loaded (or other) timings for when defaults and losses occur;
- interest rate stresses to assess the materiality of unhedged exposures, as well as carrying costs associated with defaulted assets, see Fitch's [Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria](#);
- basis risk stresses to assess unhedged exposures regarding different interest rate bases for assets and liabilities; and
- foreign-exchange stresses to assess exposures to unhedged currency risks.

The extent and nature of cash flow stresses adopted will depend on the asset class and type involved and the financial structure of the transaction concerned. For example, Fitch may adopt stresses tailored specifically to transactions where cash flows rely heavily on the terms and conditions of embedded derivatives.

Fitch's ratings of SF instruments typically address the likelihood of receiving payments in accordance with the terms and conditions of the notes, as described in transaction documents. The agency will thus model the different interest terms (i.e. interest deferral mechanisms) detailed in documents and analyse their impact. For details of instances where ratings may be assigned which do not reflect the terms and conditions of the notes, please refer to *Appendix 4: Rating Caps and Limitations*.

While repayment in full is typically based on an expected maturity date, Fitch's rating addresses full repayment of principal by the stated legal final maturity (plus any grace period allowed under the documentation), which can often be several years after the expected maturity date. Fitch's rating analysis assesses if the distribution of interest and principal proceeds, including recoveries after working out defaulted assets, will be sufficient to repay the notes' principal by the legal final maturity.

Where the notes are not structured to allow for interest deferrals or shortfalls and the notes do not receive their full interest on a specified payment date, Fitch will consider such notes as defaulted, and the ratings of the notes would be downgraded to 'Ds' to register the default in Fitch's transition studies, unless the defaulted amount is considered immaterial to the rating opinion. For example, this could apply to a very small payment default as the result of a large one-off expense (see *Surveillance* below). The ratings of the notes may subsequently be raised

from 'Dsf' to reflect future performance expectations for the notes where all defaulted interest has been fully repaid, and no interest deferrals are projected in the expected base case.

Pro Rata Structures

Senior notes in SF transactions with pro rata pay structures are particularly sensitive to the timing and pace of any performance deterioration because funds that would have been used to build credit enhancement for senior notes are paid as principal for mezzanine or unrated liabilities.

Lower overall losses that occur later in the transaction's lifetime can therefore be more detrimental for senior noteholders than higher, front-loaded losses. Moreover, standard credit protection features may not shield senior notes as effectively from performance deterioration. For example, high excess spread may prolong pro rata periods, which could become more detrimental for senior notes if asset performance later deteriorated.

Pro rata structures can be hybrid or pure pro rata. Hybrid structures are more common than pure pro rata. Hybrid structures switch from pro rata to sequential payments and vice versa when certain triggers are breached and with the general aim of speeding up the senior notes payment when deal performance deteriorates. The effectiveness of protection for senior noteholders depends on the nature of these triggers, the timing of the trigger breach, how the triggers interact with other structural features (most notably the presence of a revolving period) and the characteristics of the asset portfolio as they can evolve during amortisation.

To account for these risks, Fitch analyses the deal's specific tests and triggers considering stress scenarios for the relevant variables (eg prepayment speed, default distribution, excess spread availability, portfolio composition and pool performance during the revolving period with reference to the performance variables that drive the pro rata triggers) that may go beyond those specified in the applicable sector-specific criteria. In the absence of mitigants, the senior notes of a pro rata structure would need more credit support for the same rating as those in a sequential structure.

Revolving Periods

SF transactions sometimes feature a revolving period, during which, for a specified period, principal collections are used to purchase additional assets, rather than to repay principal on the notes. Revolving periods expose noteholders to additional risk through a longer risk horizon, adverse movements in portfolio asset quality and origination standards, and increased defaults compared to a static portfolio.

Fitch will analyse structural mitigants to these risks, some of which Fitch has observed are performance-based early amortisation triggers and portfolio limits regarding certain characteristics (for example, average loan-to-value) which limit the extent to which a portfolio is permitted to evolve. Fitch will take such mitigants into account in its analysis. Due to the risks associated with revolving periods, Fitch expects them to be time-limited, with the length of the period dependent on the characteristics of the asset type being securitised. More detailed criteria with respect to asset types that typically see revolving periods in related transactions will be included in associated sector-level criteria. Fitch may decline to rate or may cap the maximum achievable rating of transactions with revolving periods that pose excessive risk (for example, very long revolving periods).

Master trusts are issuance vehicles with rolling revolving periods that issue multiple sets of liabilities from a single pool of assets. Fitch analyses them similarly to transactions with fixed revolving periods or warehouse facilities (see below).

Warehouse Facilities

Warehouses are revolving structures and may be structured as a single-purpose facility or with rolling revolving periods. Fitch will analyse these structures similarly to structures with defined revolving periods by assuming that the portfolio will migrate towards the outer bounds allowed by the warehouse facility's eligibility criteria and portfolio parameters.

Single-purpose warehouse facilities are similar to transactions with defined revolving periods, while warehouses with rolling revolving periods can transfer receivables out of the facility, such

as to another SF transaction, potentially leaving a concentrated portfolio. Fitch expects structural features, such as limits on weighted average and higher risk pool characteristics and limits that prevent concentration, to mitigate this risk.

Maturity Risk

For all types of financial structures, Fitch will apply the cash flow criteria for the specific asset class in question where relevant. For example, the criteria may specify scenarios involving varying prepayment speeds where a slow prepayment speed stress is applied to determine if a shorter pay bond with a legal final maturity earlier than that of the underlying assets will be repaid in full at its maturity. Similar stresses would test the ability of structures to accumulate sufficient principal funds to be able to meet bullet repayments by their legal final maturity.

Fitch also assesses if the legal final maturity date provides sufficient time needed for loans to be worked out beyond the expected maturity date. Similarly, bonds that pay pro rata will be tested in accordance with asset class criteria to assess whether credit enhancement will remain sufficient in the later stages of a transaction when the portfolio has amortised significantly, such that issues of asset concentration or adverse selection may arise in the portfolio.

Representations and Warranties

SF transactions typically contain representations and warranties relating to the underlying assets (including those regarding ownership and title to the assets), as well as the organisation and status of key transaction participants. SF transactions also typically include enforcement mechanisms that are available for the benefit of investors to address a breach of a representation or warranty.

Fitch reviews the representations and warranties and enforcement (RW&E) mechanisms contained within a transaction and will typically publish the RW&Es available to investors which were disclosed in the transaction's offering documents and that relate to the underlying asset pool. Fitch will also publish a description of how the transaction's RW&Es differ from those typically seen for that asset class as highlighted in [Representations, Warranties and Enforcement Mechanisms in Global Structured Finance Transactions](#) (May 2016). Any deviations will be highlighted and the rating approach in relation to any omissions which present credit implications will be described.

Purchased pools often have RW&Es from the seller that are weaker than those typically seen for that asset class. In this case, further comfort may be taken by Fitch through extended legal due diligence, third-party file reviews (potentially conducted on a larger sample than is usual) or by applying more conservative asset assumptions.

Investor Action

Fitch's rating analysis looks to legal final maturity. As such, Fitch assumes that investors will not exercise options or rights available to them that will cause a payment default or loss on a rated note, where Fitch's rating opinion expects that the rated note is capable of continuing to maturity without a payment default or loss arising. Examples include noteholder options to liquidate collateral or to receive alternative securities in settlement of the obligation, in lieu of cash. Similarly, where a note event of default occurs, if it is Fitch's rating opinion that the transaction would not suffer a default or loss in the event of the transaction continuing until maturity, then Fitch will assume in its analysis that rights to enforcement or acceleration will not be exercised.

Notwithstanding the above, there may be instances where investors vote to exercise an option to redeem all notes, which subsequently generates a loss on the rated par value of the notes.

Where the exercise of such options or rights is at the discretion of a senior class of noteholders over a subordinated class, Fitch will consider the potential impact of exercising such options or rights on the subordinated class when forming its rating opinion. Similarly, in the event that changes to the priority between noteholders would occur as a result of a note event of default and an acceleration of the notes, at such time Fitch will consider the potential impact of the change in priority in its rating analysis, where this could bring a relative advantage to a controlling class of noteholders over another class. In addition, transactions where a note event of default has been triggered and remains in force may become subject to a rating cap, where this is indicative of future performance uncertainty or volatility for the transaction.

Counterparty Risk

All SF transactions include an element of reliance on counterparties, in the form of operational reliance, credit risk exposure or a combination of both.

Operational risks are a direct result of the counterparty's ability to perform specific operational functions, and can be vital to ensure timely payments to noteholders. Operational risks include asset pool servicing, transaction administration, and ancillary services, asset management, and allocation of available funds through the SF transaction's priority of payments.

Credit risk results from the SF transaction incurring a loss of cash flows due to a counterparty being unable to meet its financial obligations, or the counterparty losing transaction funds at the time of default. Examples of credit exposures include derivatives, liquidity facility providers and any entity holding transaction funds.

Fitch analyses any counterparty dependencies as these represent operational exposures and/or credit exposures beyond the securitized asset pool. If sufficient isolation from any material credit or operational risk introduced by a counterparty is not achieved, the SF bond's rating may not exceed that of the counterparty introducing that risk.

For further details of Fitch's counterparty risk analysis, see [Structured Finance and Covered Bonds Counterparty Rating Criteria](#) and [Structured Finance and Covered Bonds Counterparty Rating Criteria – Derivative Addendum](#).

Fitch's operational risk teams or rating analysts review the processes of each originator, servicer, or asset manager participating in a Fitch-rated SF transaction.

Operational Review

The originator, servicer and CDO asset manager as transaction participants can affect the performance of the underlying assets and, ultimately, the SF transaction. Where applicable, Fitch's rating analysts review the operational processes for each originator, servicer, or asset manager participating in a SF transaction rated by Fitch, when assigning new ratings.

Whether indicated by an internal score, opinion, or public rating, the assessment may lead to adjustments to a transaction's base case expected loss and credit enhancement levels, an application of a rating cap, or cause Fitch to decline to rate a transaction. Where applicable, Fitch's originator, servicer, and asset manager review criteria are published as part of the respective sector-specific or bespoke criteria reports or as separate criteria. When relevant for transaction ratings, Fitch will carry out reviews of originators, servicers and asset managers under the surveillance process documented in sector-specific criteria.

Fitch assesses the risks associated with the originator's products, programmes, and underwriting guidelines, including those risks embedded in less stringent and aggressive origination practices and controls, since these assets will have a greater propensity to underperform than those assets originated under more stringent guidelines and controls. The review looks to assess whether collateral from an originator is likely to perform in line with, better, or worse than collateral from other originators in its peer group in times of stress.

Propensity for better performance (relative to expected performance for a portfolio with similar characteristics originated by a typical originator) may be indicated by the quality of origination controls and the use of best practices. The quality of the originator's practices and controls will also be of particular importance in revolving transactions, where receivables that are to be originated in the future will be sold into the transaction using principal repayments on the existing portfolio (see also *Revolving Periods* above).

For certain asset classes, Fitch will complete file reviews as part of the originator review process, in line with its sector-specific or bespoke criteria. The purpose of the review is to provide examples of the origination and underwriting processes for Fitch to better understand how the processes are performed and to cross-check data provided in the portfolio data files. Such file reviews are typically very limited in terms of scope and sample size. For example, a review may consist of Fitch selecting 10 loan accounts from a list of those expected to be included within the securitisation transaction. Fitch will then review the originator's physical and/or electronic records of the selected accounts.

In general, Fitch expects an originator/SF issuer to have sufficient operating experience in the relevant market and in originating the product comprising the asset pool.

Any inconsistencies identified (e.g. between paper and electronic files, or between the described and observed processes) would be discussed with the originator and may be taken into account in the rating analysis, depending upon Fitch's opinion of the materiality of such inconsistencies.

In general, Fitch expects an originator to have sufficient operating experience in the relevant market and in originating the product comprising the asset pool. Fitch also will expect the originator to provide historical performance data as well as historical loss severity and recovery data.

When rating CLOs, Fitch reviews the asset manager to assess its operational ability to manage a CLO transaction, as explained in the [CLOs and Corporate CDOs Rating Criteria](#).

Servicer Reviews

The primary responsibility of the servicer is to collect and distribute payments from the underlying assets to the trustee for the benefit of the bondholders. In certain SF sectors, servicers have additional responsibilities such as advancing delinquent loan payments and negotiating loan workouts. Fitch's servicer review process is designed to identify and evaluate the quality of a servicer's loan administration and default management processes, compliance with stated guidelines, operational stability and in jurisdictions where servicer continuity is less certain, financial stability, when needed for the rating analysis.

The servicer review process assesses the company's strategy for handling assets in various jurisdictions and conditions, procedures to stay informed on current legislation, and methods of integrating these changes into its loan servicing processes. In addition, a servicer's internal control framework is of particular importance to Fitch as it demonstrates the servicer's commitment to sound operational business practices.

Surveillance

Once Fitch rates an SF transaction and if the ratings are not point in time, the transaction will be subject to surveillance. Of the key rating factors outlined in this report, asset quality, financial structure and operational risk often evolve over the term of a transaction. Asset isolation and legal structure in contrast, are usually stable, affected only by specific events and will not be reviewed as part of surveillance unless any material change is identified.

With respect to asset quality, financial structure and operational risk, Fitch monitors rated transactions using asset performance and cash remittance information supplied by servicers and trustees and any other relevant information. The surveillance process involves a number of quantitative and qualitative functions to assess the performance of rated tranches, which may include monitoring pool-level performance indicators, comparing current credit enhancement levels against forecast or stressed assumptions, assessing the impact of market developments on the performance of transactions, and loan-level analysis. For operational risk, Fitch also reviews of originators, servicers and asset managers under the surveillance process documented in sector-specific criteria, when this is relevant for transaction ratings.

Monitored ratings are subject to regular scheduled reviews by a rating committee at least annually for international-scale ratings and in line with local regulation for national-scale ratings. If a rating action appears warranted for reasons including reported transaction performance, Fitch's asset performance outlook or the occurrence of a credit event, a committee review will be undertaken promptly. Rating actions for some transactions occur more frequently, particularly if performance of the underlying pool exhibits rapid deterioration.

Credit events are discrete developments that may affect the rating analysis of certain transactions. Examples of credit events include: a reduction in the rating of a counterparty; a change to the underlying legal framework; a material transaction document amendment; or any other event on a case-by-case basis thought to have a material credit impact. Upon Fitch observing or being notified of any such event, the agency will consider the extent to which the rating analysis may be affected.

In respect of potentially material events, Fitch will hold credit discussions on the event in question. To the extent that the event is not expected to have an impact on ratings or there is a rating committee outcome with no rating impact, Fitch may publish a non-rating action commentary (NRAC) with a description of the event and a confirmation that there is no rating

impact. If the rating committee outcome is that there is rating impact, the resulting rating action will be published in a rating action commentary (RAC).

Under Fitch's surveillance analysis, notes that experience a very small payment default as the result of a large one-off expense for example may be considered non-material to the rating opinion (whether through a very small amount of interest deferral, or a principal loss that is not expected to recur). In Fitch's view, the recognition of such small amounts as a downgrade or default would not effectively reflect the substance of the notes' credit position where transactions have otherwise shown a strong credit profile throughout their lives.

Such instances are expected to be infrequent and the circumstances will be specific to each transaction. As a general rule, such instances would not be expected to exceed one month's cash flows owing to the rated security. Fitch derives its base-case loss expectations in consideration of the transaction's expected performance. If the transaction is not able to withstand Fitch's loss expectations, the agency will assess the evolution of asset quality, cash flow certainty and how much greater expected losses are compared to the transaction's current credit enhancement at each rating level, to determine which distressed rating to apply to a bond.

Sector-specific criteria reports do not usually address stress scenarios below 'Bsf'. Instead, Fitch makes projections of expected performance based on the current circumstances, without applying additional stress.

In addition, Fitch will take into account the likely occurrence of a DDE and the security's ability to meet its obligations in the near future. See *Appendix 3* for further details of Fitch's approach in determining DDEs. Fitch will assess the default likelihood of distressed bonds in accordance with its ratings definitions. Bonds that have already defaulted or experienced an irreversible principal write-down will be rated 'Dsf'. Further details of Fitch's Rating Definitions are available on its website.

Specific surveillance criteria may be published by individual asset groups to explain the process for that group's surveillance and any methodological aspects that are specific to the surveillance of the rating. For example, specific surveillance criteria may address the process for downgrade rating action for sectors that have experienced stress, to explain how rating actions are taken.

Transactions are reviewed using the latest remittance reports and any other relevant information available.

Ratings Assigned to the Swap Obligations of SF SPVs

Fitch can assign a rating to a swap obligation of an SF SPV in line with the rating of a referenced note when the following conditions are met:

- The SPV's obligations to the swap counterparty are *pari passu* with the referenced note;
- The swap relates to a specific Fitch-rated note tranche from an issuer SPV or a structure-specific loan or term advance from a related SPV in a structure with a credit profile consistent with a rated note tranche from an issuer SPV;
- The notional amount of the swap equals the principal amount of the note to which it relates in the currency in which the note is denominated;
- Any amounts due to the swap counterparty, which are due at a level subordinated to the regular swap payments in the priority of payments, relate only to certain non-credit events (such as illegality, tax events, force majeure or other events beyond the control of either party) or to counterparty behaviour, which are not considered in the rating; and
- The terms and conditions for payment under the swap are reflective of those of the rated note to which the swap is attached and are no more onerous than those of the related notes.

Fitch considers the points above to confirm if the credit risk presented by the SPV to the swap counterparty is equal to the credit risk presented by the SPV to the referenced note. For a rating of a swap obligation that is the same as a specific note rating, if the rating of the referenced note changes, this will lead to an equal change in the rating of the SPV's swap obligation.

The ratings assigned to the swap obligations of an SPV are based on the swap counterparty performing under the swap and will be withdrawn if the swap agreement is terminated due to non-performance by the swap counterparty or due to a non-credit event. Fitch expects

counterparty replacement upon downgrade below certain thresholds, which means non-performance by the counterparty is considered unlikely. Fitch mainly applies these criteria to currency swap obligations because currency swaps tend to have a notional balance equal to the principal balance of the related note. Fitch has rated the interest-rate swap obligations of an SF SPV, but these types of ratings are not commonly applied to interest-rate swap obligations. This is because SF interest-rate swaps often do not have a notional balance in line with the principal balance of a specific note; in such cases this criteria could not be applied.

Rating Assumption Sensitivity

For each new rating, Fitch completes a rating sensitivity analysis. For public ratings, the analysis is published in the transaction presale reports. For each class of rated note, the analysis indicates the rating impact from the application of more stressful asset assumptions. For example, the sensitivity analysis may show that the rating of the class A note would be expected to migrate to 'Asf' from 'AAAsf' if the base case default assumption is increased by 50%, and other factors are kept constant. For most transactions, the sensitivity analysis is based on model-implied ratings only and this is indicated in the relevant rating report. The sensitivity analysis parameters are selected according to the key performance parameters of the relevant asset class and are detailed in the related sector-specific or bespoke criteria.

Reasonable Investigation

In issuing and maintaining its ratings, Fitch relies on the factual information it receives from issuers and underwriters and from various third-party sources Fitch believes to be credible. As part of the rating process for transactions initially rated and reviews completed from 1 December 2010, Fitch conducted and conducts a reasonable investigation of the factual information relied upon by it. This includes information from independent sources, to the extent such sources are available for a given security.

In case information cannot be verified to a satisfactory extent, Fitch will assess the materiality of the information to its rating analysis. If Fitch intends to rely on unverified information, and this information could materially affect the analytical outcome, Fitch will alter its assumptions or cap its ratings to reflect the increased uncertainty, or decline to rate (for a new rating) or withdraw existing ratings if Fitch believes the uncertainty cannot be appropriately reflected in the analysis.

Prior to 1 December 2010, Fitch did not typically conduct an investigation into the available information in the manner adopted thereafter. In particular, Fitch did not typically receive any verification of the information provided about the asset portfolio before the transaction closed. Nevertheless, as with all transactions under surveillance, Fitch has monitored the performance of the outstanding transactions that closed before 1 December 2010 and uses this extended record to check that the information relied upon for its initial analysis was sufficiently reliable. If the monitoring highlights inconsistencies between the reported asset performance and the agency's expectations given the operating environment, Fitch undertakes a further review of the quality of the data provided and seeks explanations for any material inconsistencies.

Transactions Rated Solely Under Master Criteria

The master rating criteria may apply directly or be supplemented with sector-specific criteria or bespoke criteria. Where master criteria apply without sector-specific or bespoke criteria, the master criteria must address all rating drivers and key rating assumptions. Master criteria may also apply without sector-specific or bespoke criteria for national scale ratings if the number of Fitch-rated issuers within the sector is fewer than five.

Examples of where Fitch may apply the master criteria without sector-specific or bespoke criteria include event-driven rating confirmations that result in no rating impact, analysis of fully defeased transactions and transactions where only distressed ratings are outstanding.

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 rating committee where the risk, feature or other factor and the methodology applied to it are both included within the scope of the criteria, but where the analysis described in the criteria needs to be modified to address factors specific to the particular transaction.

Applying Unforeseen Macroeconomic or Industry Developments to Criteria Assumptions

Fitch's rating criteria aim to consider a broad range of market conditions, including severe and low-probability economic and credit risk scenarios. However, when we project a more significant stress than what is included in the current criteria framework due to unforeseen macroeconomic or industry developments, we may need to adjust key assumptions to maintain prospective and timely ratings in certain sectors.

In such cases, analytical rating teams may perform an additional stress analysis using updated assumptions that reflect Fitch's view on new macro-economic or industry developments. Only affected key rating assumptions would be adjusted while all other elements of the criteria, including what are the key rating drivers and the mechanisms for how the criteria are applied, will remain unchanged. For sectors that rely on model-implied ratings, the model-implied ratings from both the assumptions under the criteria and the new stress assumptions will be considered in the rating decision. The new stress assumptions will be more severe than the base assumptions and can only lead to the same, or lower, ratings than the base assumptions.

Examples of when the additional stress analysis will be used to determine ratings include, but are not limited to catastrophic events, pandemics, significant changes to the regulatory or legal environment, and any unexpected developments that lead to a sudden and significant shift in projected consumer or industry behaviour.

Fitch will provide a public disclosure detailing the **expected** adjusted assumptions, which may be **subject to change**, at the beginning of a period that includes additional stress scenarios in its rating analysis. Rating action commentaries will disclose and describe the additional analysis and how it was considered in the rating decision. The period will end when the new stress assumptions are incorporated into the criteria or are no longer applied, which will be publicly disclosed.

Criteria Disclosures

In the initial rating report or RAC, Fitch expects to disclose the following items, along with any relevant items specified in applicable cross-sector and/or sector-specific criteria:

- if market-wide data, rather than originator-specific data, is relied upon in the transaction analysis, as per *Data Adequacy* above, and this use is not covered in the sector-specific criteria;
- the credit implications of deviations from representations and warranties and enforcement mechanisms typically seen for that asset class, as per *Representations and Warranties* above; and
- any variations to criteria, as mentioned in the section *Variations from Criteria* above.

In a subsequent RAC related to surveillance actions, Fitch expects to disclose the following, along with any relevant items specified in applicable cross-sector and/or sector-specific criteria:

- any variations to criteria.

Appendix 1: Special-Purpose Vehicles in SF Transactions

This appendix describes Fitch's expectations with respect to bankruptcy-remote SPVs used in SF transactions. The agency's analysis of the SPV is concerned primarily with the degree to which the assets have been isolated from the corporate credit risk of the originator and/or the SPV's owner and other affiliates. The means of achieving this may vary between jurisdictions, asset classes and structures, and references to SPVs herein should be understood to mean an insolvency-remote entity; such references should not be construed as having any accounting-related meaning.

Fitch's analysis will use the principles detailed below to determine the benefit a given SPV provides to a transaction. In following these principles, the analysis will consider the role each SPV plays in a given transaction – whether the SPV is the issuer, a borrower, an intermediate purchase company, or otherwise.

Formation of an SPV

Type of Vehicle

Fitch considers transactions with SPVs in many different legal forms. The legal form of organisation is not necessarily a determining factor in Fitch's assessment of the degree of risk; whether it is a determining factor will be assessed through the review of the characteristics of the SPV in the context of the overall transaction structure, the impact of the legal and tax regimes in the relevant jurisdictions and the purpose and role of the SPV in the structured finance transaction (i.e. issuer, borrower).

Operational History

A newly formed SPV created for a specific securitisation transaction will, by definition, not be encumbered by any previous operating history. A newly established SPV has the benefit of a limited and known operating history and few creditors and liabilities at the outset of the transaction. For this reason, a new vehicle may have a reduced insolvency risk. Therefore, the creditors involved in the proposed transaction can – by agreeing to limitations on their individual rights to take bankruptcy or recovery action against the SPV or its assets – largely define the degree of insolvency risk of the SPV (see *Limited Recourse and Non-Petition Provisions* under the *Mitigating Factors* heading, below).

However, insolvency risk is also influenced by factors outside of the securitisation structure, such as the applicable legal regime and its interpretation, and cannot be exclusively defined by contractual arrangements amongst the creditors.

An SPV that is not newly formed may achieve the same benefits for the transaction as one that is newly formed, if adequate structural and contractual provisions have been put in place to reduce or eliminate any impact of legacy transactions on the vehicle. If an SPV is not newly formed, Fitch will typically request substantial supporting evidence for its suitability for use in a structured finance transaction. For SPVs that are not newly formed, relevant considerations include:

- information about the nature and extent of the SPV's historical business operations;
- the amount of actual and contingent liabilities and the identity of its existing and potential creditors (including any actual or contingent liabilities of the SPV that have arisen or may arise because of the group to which the SPV belongs);
- any material tax, litigation and/or other liabilities; and
- any information about the way in which the SPV has historically operated, which may mitigate any of the issues set out above.

Existing SPVs may achieve the same objectives for the structured finance transaction as a new SPV.

Fitch expects the SPV to have independent existence and to operate independently of the SPV's owner and any other affiliates.

Multi-Issuance SPVs

Sometimes a sponsor will prefer to use a multi-issuance (rather than a single issuance) vehicle. Where this is the case, Fitch will review the structure and documents to assess whether the multi-issuance SPV achieves materially the same protection for investors in its individual issuances as those investors could expect from investing in the same assets via a single issuance SPV. Certain issues Fitch will examine include the following:

- If there is effective legal segregation (or compartmentalisation) of particular pools of assets and cash flows for the group of transaction creditors of each series issuance, and if there is any risk of liabilities of one series (or compartment) attaching to the assets of another series (or compartment). This will include if any party involved in more than one series issuance of the same multi-issuer can set off its liabilities in respect of one series (or compartment) against a different series (or compartment).
- How effectively the segregation of assets and liabilities has been entrenched in the structure to ensure that no existing series (or compartment) can be prejudiced or impaired by the terms of issuance of any other series (or compartment).
- How the structure allocates responsibility for third-party liabilities (eg tax and administration and advisor fees incurred by the multi-issuer SPV) to see if the liabilities are adequately allocated between the individual issuances.
- Whether the structure provides for separate enforcement of security for individual note issuances and any impact this may have on other series (or compartments).
- The operational procedures established to separate the asset cash flows and to mitigate commingling risk in respect of different series issuances.

Some jurisdictions have passed specific legislation for the legal segregation of assets and liabilities, in respect of individual series issuances in a multi-issuance vehicle. In other jurisdictions, the legal segregation is effected by contract and/or trust law. In each instance, Fitch will review the effectiveness of the mechanisms used to achieve the legal segregation of assets and liabilities in respect of different series issuances in a structure. The relevant transaction documents are key to Fitch's review. Fitch also expects the transaction legal opinions to confirm the enforceability of the legal aspects of these mechanisms.

Separate Existence

Fitch will consider not only whether an SPV has an independent legal existence, but also whether the SPV has the ability to operate independently of the SPV's owner and any other affiliates. In some jurisdictions, matters such as management and shareholder control, maintenance of its own accounts, books and records and advisors, arms-length terms for its place of business, separateness of its assets and funds and ability to operate independently of the originator and owner are among the factors considered in this assessment.

No single factor is in and of itself sufficient to determine whether the SPV has a separate existence. For example, the presence of independent management or directors does not guarantee that the SPV cannot become a bankrupt entity upon an insolvency filing of another related entity. Rather, Fitch will look for such an assessment to be supported by the full range of factors deemed relevant to support a separate existence in the relevant jurisdiction.

If the SPV cannot be considered to exist independently of all other parties – e.g. its parent or an affiliate – Fitch may decide that no instrument issued out of the SPV can be rated higher than the rating of the party on which the SPV is dependent.

“Orphaned” or Not

SPVs may be (and in Europe commonly are) “orphaned”, that is, not legally or beneficially owned or controlled by the originator of the securitised assets nor any other enterprise with an interest in those assets or the SPV. In such cases, the beneficial ownership of the SPV will often be held on trust for a charity by the immediate legal owner, which will often be a professional company specialising in the management of such vehicles and which performs the management duties for a fee.

There may be commercial, tax, structural or legal reasons for an SPV not to be orphaned. This may be the case where there are one or more intermediate SPVs in a structure through which note issuance proceeds and/or asset cash flows pass. In this case, Fitch will review the safeguards and any aspects which may compromise the separation of the SPV from its parent or sponsor.

When the SPV is part of a group of companies, risks arising from the use of a non-orphaned SPV include exposure of the SPV to group tax or employee pension liabilities, or the risk in some jurisdictions that a court may order the consolidation of the SPV's assets with those of its parent

entity in the parent's insolvency proceedings. To the extent that those risks exist in a particular jurisdiction, Fitch expects those risks to be addressed.

A non-orphaned SPV may achieve the same benefits as an orphaned SPV where relevant mitigants (such as noteholder control and strong separateness provisions) are present and respected.

Jurisdiction

The choice of jurisdiction for the SPV can be influenced by many factors, not all related to mitigation of the risk of insolvency.

Tax considerations in the form of both potential liabilities and benefits for the relevant SPV, or in relation to payments received on the underlying assets, can often be significant elements affecting the choice of jurisdiction by the transaction parties for the establishment of an SPV. Whether any SPV in the structure is exposed to tax liabilities in its jurisdiction of creation, or whether taxes will be imposed to reduce the cash flows or other income or proceeds available from the underlying assets, will have a consequential impact on the ability of an SPV issuer to service its rated debt.

Low or no tax jurisdictions are often chosen as the place to establish the SPV to mitigate the tax risk. However, in cases where it is nevertheless (for other reasons) beneficial to establish the SPV in a jurisdiction that exposes the SPV to potential tax liabilities, Fitch will expect to receive information about the nature and amount of the potential tax liabilities that may be imposed, how such liabilities are calculated, and any structural considerations that may neutralise or mitigate their impact. Fitch will assess the impact of any potential tax liability on the transaction as part of the cash flow analysis.

Limitations on Activities

Fitch expects restrictions to be in place in the transaction that will preserve the future independence of the SPV. It is also expected that these restrictions will limit the business the SPV may engage in to only what is necessary for it to perform its obligations under the transaction documents. This reduces the risk of new liabilities and creditors being created, which may adversely affect the transaction or the solvency or bankruptcy remoteness of the SPV. Fitch expects these restrictions to be maintained for the duration of the transaction.

Depending on the laws of the relevant jurisdiction in which the SPV has been established, restrictions on the SPV's business activities and transactions can be entrenched through the documents forming the SPV and/or through contractual restrictions in the transaction documents and, optimally, both. Fitch would expect such restrictions typically to include:

- prohibition of change of ownership;
- covenants to maintain a separate business existence;
- limited ability to amend the constitutional documents;
- restrictions on any asset dealings (beyond those necessary for the SPV to enter into and perform its obligations under the relevant structured finance transaction documents);
- narrowly defined objects and powers (to those necessary for the SPV to enter into and perform its obligations under the structured finance transaction documents);
- restricted powers of directors;
- no additional borrowings, finance raisings, guarantees, additional granting of security and the like (save in limited exceptional circumstances where debt is subordinated and the subordinated creditors have agreed to be subordinated to the existing structured financing);
- no operating business;
- no employees; and
- no commingling of assets with other parties.

Other limitations, in addition to the above, may be put in place for some structures. Fitch will always review the applicable limitations in their entirety.

Depending on the jurisdiction, other forms of legal comfort or mitigant may be present that preserve the independent ownership of the SPV (for example, where the ownership interest in the SPV is widely held).

Limited Recourse and Non-Petition Provisions

As all the transaction creditors involved in a potential structured finance transaction are known and identifiable (the noteholders, security trustee, liquidity providers, swap counterparty, and any other party contracting directly with the SPV), they can (subject to any applicable legal restrictions) agree contractually in the transaction documents to limit their (individual) legal rights to take insolvency or other recovery action against the SPV or its assets.

The limitations that the transaction creditors typically agree to at closing are set forth in the limited recourse and non-petition provisions in the SPV formation documents and/or transaction documents. In agreeing that their secured debts are limited recourse, the transaction creditors agree to have recourse only to the assets of the SPV for repayment of the amounts owed to them.

Under the non-petition language, the transaction creditors waive their rights to sue the SPV individually and agree not to take any steps to “petition” a court to put the SPV into bankruptcy or other insolvency proceedings for non-payment of its debts to the creditor. In certain jurisdictions, an unlimited restriction on a creditor’s right to take such action against the SPV may not be enforceable. In these instances, it is usual for creditors to agree a restriction that lasts for any applicable suspect period, plus a day after the issued debt is repaid.

Fitch expects transaction creditors to agree to limited recourse and non-petition covenants. In circumstances where a structure may not include limited recourse and/or non-petition covenants, or where there are restrictions on these covenants, Fitch will expect information as to the reasons for this (together with any structural mitigants). This will allow the agency to assess the risks to the SPV and consequently, whether the structured finance transaction can be said to benefit from limited recourse and non-petition covenants.

To further limit the risk that transaction creditors may (despite the existence of limited recourse and non-petition covenants) seek to take individual action to enforce repayment of their secured claims, structured finance transactions often use a security trustee, which holds and enforces the security on behalf of all the transaction creditors.

Priority of Payments

Having a known universe of transaction creditors means that these creditors can agree to clear priorities in respect of the repayment of their liabilities by allocating the cash flows and other proceeds from the assets, according to a predefined distribution (or waterfall). Fitch will examine these arrangements to confirm that they reduce uncertainty of outcome and establish effectively the priorities of the noteholders and other transaction parties, both before and after the occurrence of a default.

Fitch will also examine the arrangements for the priority of repayment to any third-party SPV creditors (such as tax authorities) that are not transaction parties and therefore may not be bound by the limited recourse and/or non-petition covenants, and also may be mandatorily preferred by law.

Isolation of Financed Assets

Fitch expects that structured finance transactions are structured to achieve such isolation and the agency will, as part of its analysis, undertake an assessment of the effectiveness of the proposed mechanisms to achieve this.

The precise mechanisms may vary depending on the relevant jurisdiction and on the objectives of the transaction sponsor. One established mechanism is by way of a sale of the underlying assets to the SPV (a true sale), the aim of which is to give effect to the transfer of title in a way that defeats as much as possible the ability of the originator (or any creditor of, or insolvency official appointed to, the originator) to overturn the sale and claw back the assets sold. How the

Structured finance transactions typically limit creditors’ rights through limited recourse and non-petition provisions.

transfer to an SPV of title to the assets is achieved will depend on the type of asset, its location, the law governing the asset and the law governing the sale.

Where the beneficial (or equitable) title, rather than the legal title of assets, is transferred at the outset of a transaction, Fitch will expect the structure to include appropriate perfection mechanisms to complete the transfer of legal title to the SPV at a point in time sufficiently prior to enforcement. This typically occurs in jurisdictions where the assets being transferred are in the form of a debt and the requirements under the applicable laws for an effective legal transfer to the SPV include notice in writing to the debtor or obligor. In these circumstances, the originator may not find it practical (or desirable) at the outset of the transaction to give the required notice to its underlying debtors to effect a legal transfer of the assets.

Alternatively, isolation of the assets is in some transactions achieved through an intermediate SPV acquiring the assets, which in turn is funded by a secured loan from another SPV (which in turn issues securities to finance the loan).

Whatever mechanism or structure is used, Fitch assesses the extent to which the assets have been isolated from the transferors and the SPV's controlling party. Fitch expects the transaction legal opinions to address the risks in the relevant jurisdiction(s) that an insolvency of the asset originator, or any other transferor, will result in the assets being clawed back into the insolvency estate of such entity.

Fitch analyses the relevant documents to assess the extent to which the assets in the SPV have been isolated from other parties.

Operational Capacity

Fitch expects the SPV to have sufficient support from operational counterparties, notably the note trustee and/or the security trustee, to enable it to operate on a day-to-day basis and particularly in a crisis. The agency expects the responsibilities of the operational counterparties to be clearly defined in the transaction documentation and the counterparties to have the powers to be able to effectively address issues that may arise, thereby minimising the risk of transaction disruption.

Other Potential Threats to the SPV

Unlike operating companies, SPVs are restricted by their formation and transaction documents and do not have the ability to borrow or raise capital to remedy cash flow shortfalls, or asset, security or transaction structural problems. For these reasons, Fitch does not expect the SPV to be vulnerable to a range of risks, including:

- re-characterisation of asset transfers;
- consolidation with its affiliates or service providers;
- tax obligations (including corporate tax, VAT, stamp duty or transfer taxes on realisation of collateral);
- pension liabilities (or other employee-related liabilities), tax liabilities or insolvency risk belonging to a group (usually that of the originator);
- thin capitalisation or other accounting-related risks;
- loss of priority of security interests of the noteholders;
- unavailability of expected liquidity in the transaction; and
- obligations or liabilities attaching to assets that may require capital expenditure (such as environmental risk).

Where such risks exist, Fitch examines any mitigating features to assess the impact of those mitigating features on the rating analysis.

Issues Not Addressed by the Rating

There will always remain certain issues that are difficult to analyse, such as the risk of a vexatious or nuisance challenge, the potential for a change in the legal or tax regime and fraud. Issues such as these are not addressed in Fitch's analysis of an SPV, or in its rating opinion. Clear pending changes in the legal or tax regime at the time of assigning a rating may be addressed on a case-by-case basis.

No Issuer Default Ratings for SPVs

Fitch is sometimes requested to assign credit ratings to SPVs themselves: ie what would effectively be the equivalent of an Issuer Default Rating (IDR) for the SPV itself, as opposed to the issue ratings that are assigned to the securities that it issues.

Fitch does not assign credit ratings to SPVs in structured finance. This is because the SPV has no real economic substance of its own; its assets are segregated, it conducts no business other than its participation in the structured finance transaction and it is restricted from assuming liabilities other than the issuance of the notes that form part of the structured finance transaction (although subordinate debt may sometimes be permitted).

The SPV therefore has no senior unsecured liabilities of its own that any rating could address. The risks involved with an SPV consist primarily of whether it has been effectively legally constituted; therefore, there are no credit-related risks that a credit rating could address. A credit rating for the SPV itself would therefore have no meaning.

Appendix 2: Repackaged Structured Finance Notes

Additional considerations apply to rating securities backed by single tranches, or small pools, of existing structured finance notes. These repackaged notes (or re-securitisations) can have a senior/subordinate or simply a pass-through structure.

A senior/subordinate structure involves the issuance of both new senior and subordinate notes backed by the underlying bond(s), thereby creating extra protection for the new senior bond compared with the underlying bonds themselves. On this basis, the new senior note can achieve a higher rating than that of the original repackaged security(ies). Fitch will generally decline to rate the new most subordinated tranche of the newly repackaged transaction. If the agency decides to rate the subordinated tranche, it is likely to assign a rating below the existing rating of the note that is being repackaged.

In a pass-through structure, no additional subordination is created and the cash flows from the underlying security are simply passed through to the new notes issued by the new structure. In such a case, the rating of the repackaged note will be the same as that of the underlying security. Fitch's [Single- and Multi-Name Credit-Linked Notes Rating Criteria](#) detail the analytical approach in the case of pass-through analysis.

Fitch will generally not rate repackaged securities where the performance of the underlying collateral is still highly uncertain or expected to be highly volatile. For example, in cases where the original notes are on Rating Watch Negative or Rating Outlook Negative, Fitch may either decline to rate the repackaged notes or apply additional stresses to compensate for potential volatility.

Ratings of Repackaged Senior Notes

Fitch will typically rate only a repackaging of senior notes. Unlike senior tranches, subordinate tranches may be cut off from payments in the event of a default of the underlying transaction, in instances where senior noteholders, who control the choice of remedies, choose to divert cash flows from the subordinated notes.

Fitch may consider rating a repackaging of subordinated notes under sector-specific criteria or on a case-by-case basis dependent upon asset class, securities concerned, availability of sufficient information to analyse the underlying securities, stability of performance and rating level. In such cases, the risks associated with the subordinate position of the notes that are being repackaged would have to be sufficiently mitigated, as determined by Fitch's analysis of the proposed structure.

This also applies to rating of combination notes, where notes structured as either part of the same trust or as a separate SPV trust using tranches from other securities are combined, in whole or in part, to form new securities. Fitch's [CLO and Corporate CDOs Rating Criteria](#) detail the analytical approach for rating of combination notes, which could be applied in principle to another sector on a case-by-case basis. Fitch will not rate new combination note structures on the basis of a "rated balance" that may differ from the "stated balance" of the notes over time as there is a higher risk that the rating may be misconstrued or misunderstood by those relying on it like investors, risk managers or regulators. For case-by-case rating of a repackaging of subordinated notes, the agency's approach would be detailed in its rating communications.

In cases of the repackaging of a single or a small number of securities (typically, no more than five), Fitch will analyse underlying assets under the framework of relevant sector-specific criteria. In cases of the repackaging of multiple securities within a single SPV, Fitch may complement or replace this look-through analysis with a portfolio-based analysis that assesses correlated default risk and concentrations in repackaged securities. Fitch's [Structured Finance CDOs Surveillance Rating Criteria](#) detail the analytical approach in the case of portfolio-based analysis.

Tranche Thickness Affects Portfolio-Based Analysis

The thickness of a tranche relative to the original size of the portfolio (tranche thickness) and the seniority of the tranche can be important determinants of the tranche's expected recovery and the resulting expected loss for the portfolio.

Thin tranches, which are usually junior tranches, tend to have lower recoveries in the event of a default and, as a result, Fitch can apply lower recovery assumptions for thin junior tranches (see [Structured Finance CDOs Surveillance Rating Criteria](#)).

Derivatives from Underlying Transactions

Underlying structured finance transactions may embed various derivative contracts that aim to mitigate interest rate or foreign exchange risk. If an event of default occurs and the security over the collateral is enforced by the noteholders through collateral liquidation, the derivative contracts may be terminated. If these derivatives are out-of-the-money from the perspective of the underlying structured finance transaction, a lump sum termination payment is owed to the counterparty. This payment would typically rank senior in the waterfall and therefore would be made before any payments to the re-securitised senior notes. If there is a risk that the collateral securing underlying assets may be liquidated and/or derivative contracts terminated, resulting in a significant termination payment that ranks higher than payments to the noteholders of the re-securitised asset, Fitch is unlikely to rate such re-securitisation.

Potential Consideration of Price Paid

Fitch uses its published rating criteria to form an opinion on a security. However, when assigning new ratings to a repackaged security, the agency may also consider the price at which the SPV purchases the original security (especially if there is a substantial gap between Fitch's rating opinion regarding the likelihood of full principal return and the market price).

While these principles address repackaged structured finance transactions globally, individual sector groups may publish sector-specific criteria that augment or supersede these guidelines.

Appendix 3: Distressed Debt Exchange

Within SF, the vast majority of defaults are accounted for by missed coupon or principal payments. However, as SF transactions globally have faced more challenging asset performance and potential payment defaults following the financial crisis, incidences of possible distressed debt exchange (DDE) situations have grown within the SF sector.

Fitch may determine that a DDE results when an issuer, in conjunction with noteholders, decides to restructure or exchange the rated notes in an effort to avert a probable payment default. By definition, the restructuring or exchange will cause a reduction in original economic terms from the noteholders' perspective, and to some extent will therefore be distressed in nature. Such a reduction may consist of a reduction in, or deferral of, contractual coupon payments to noteholders.

Determining a DDE

A DDE will be determined on the merits of the individual case, but may include a change of interest payment terms from timely to deferred, an extension of the rated notes' legal maturity, a reduction in structural protection that leads to a reduction in economic terms, or a tender offer involving an exchange on terms that are significantly worse than the original contractual terms. An element of subjectivity will remain in most cases.

When considering whether a transaction or class of notes should be classified as having experienced a DDE, Fitch would expect both of the following to apply: the relevant noteholders will suffer a material reduction in economic terms compared with existing contractual terms; and the restructuring or exchange will avert a probable payment default on the underlying notes.

Fitch will make the determination of a DDE event and any adjustments to its ratings based on the agency's assessment of each specific case and at its sole discretion. Fitch determines whether a restructuring or exchange is distressed in nature by reviewing the entirety of the proposal, the motivation for the proposal, and its economic impact on the holders of each class of rated notes, based on the information disclosed to Fitch.¹

Material Reduction in Economic Terms

If, in Fitch's opinion, the proposed economic terms of a restructuring are significantly worse than the original contractual terms, or an exchange results in the investor receiving anything other than an equal amount of notes on similar terms, then there is a strong presumption that the restructuring or exchange, as the case may be, should be considered a DDE.

Fitch defines a material reduction in economic terms in an SF transaction as a restructuring or exchange proposal that results in holders of a security receiving revised terms that, taken overall, materially impair the economic position of the noteholders compared with the previous terms. It includes – but is not restricted to – any one of the following, or a combination thereof:

- reduction in principal balance;
- reduction in coupon;
- deferral of coupon payments, or payment-in-kind, on a note rated for timely payment of coupon;
- maturity extension;

¹ Fitch cannot guarantee that all relevant information is disclosed by the transaction parties, especially in the case of exchange or tender offers. Fitch expects that each issuer that has agreed to participate in the rating process, or its agents, will promptly supply to Fitch all information relevant to evaluating the ratings on such issuer or the relevant securities, including, without limitation, all material changes in any information previously provided, potential material events and the issuer's overall financial condition, which may require communication of non-public information to Fitch. We expect all such information to be timely, accurate and complete in all respects. This will include any information requested regarding tender or exchange offers made. Where Fitch cannot obtain sufficient information to form an opinion, the rating will be withdrawn at the agency's sole discretion.

- reduction in structural protection to holders of rated notes (e.g. removal of a protective trigger or termination event) leading to a negative economic impact; and
- contractual or structural reduction in the seniority of the note (the agency may determine that some changes eg, an increase in the amount of senior fees following servicer replacement, may not be regarded as material enough to constitute a DDE).

However, this does not mean that the restructuring or exchange is not in the noteholders' best interests. It may be the logical (or only) choice in the circumstances; however, the restructuring or exchange itself is, in Fitch's view, an acknowledgement of credit impairment. In determining whether investors have suffered a material reduction in economic terms, consideration may be given to whether the notes were purchased at a discount to par.²

Generally, DDEs in SF transactions involve one or more of the above. If there are no mitigating factors, the presence of any one of the above examples may be sufficient for Fitch to determine that a material reduction in economic terms has occurred. Fitch will determine during its committee process the materiality of any of the above referenced examples and factor this into its rating decision.

Although mitigating factors, such as an increase in coupon, may be present in DDEs, Fitch expects these will often not fully compensate for the impact of the DDE on affected noteholders. A rating committee will consider the restructuring or exchange in its entirety and determine whether a DDE has occurred.

Fitch's analysis may conclude that a DDE has occurred for some but not all classes of notes issued by a particular issuer. The decision will depend, amongst other factors, on the materiality of the change and the economic impact on each class of rated notes.

Default Risk

The second element required in determining that an event should be considered a DDE is whether the event will avert a probable payment default on the notes. If the notes must pay interest on a timely basis, and it is clear to Fitch that the issuer does not have sufficient funds to make upcoming interest payments in future periods, then payment default under the notes is clearly imminent. In such a case, an exchange that changes the note terms to allow for interest deferral would very likely be classified as a DDE, as the notes would otherwise default without the exchange.

In other circumstances, a DDE may be more difficult to assess. Factors commonly associated with DDEs that may assist Fitch with this assessment include the following.

- Ratings have deteriorated since the original issuance, for example, where notes that were originally rated at investment-grade level have significantly deteriorated, so that ratings have been materially downgraded.
- Collateral performance has deteriorated significantly from original expectations, or when compared with securitisations of similar collateral (for example, where delinquency rates have significantly increased and pre-payment rates have reduced).
- Supporting counterparties are distressed, for example where one or more of the parties to the original transaction (for example, a swap provider) have defaulted or are in a high level of distress.
- Secondary market prices are substantially discounted, for example where mark-to-market (MTM) values have been declining and are distressed, or are low in comparison to securities of a similar type. As noted above, depressed MTMs are not necessarily indicative of credit problems with the notes themselves, for example where MTMs are depressed generally due to restricted liquidity in the market. However, where individual notes are valued substantially below otherwise comparable instruments in their peer group, this may be an indication of distressed performance.

² Fitch rates securities issues according to their contractual terms and conditions. Although mark-to-market values of securities may provide some indication regarding the nature of the exchange, such values themselves do not exclusively enter into Fitch's determination of whether investors have suffered a "material reduction in economic terms".

These are only potential indications and it is possible that Fitch may make a DDE determination in the absence of one or more of the above. Conversely, Fitch may not consider a DDE to have occurred, even if one or more of the above are present.

Rating Implications

Pre-Execution

When Fitch is informed of a proposed restructuring or exchange for the notes, which the agency determines to be a potential DDE, the credit rating of the notes affected may be placed on Rating Watch Negative. Once the details of the formal exchange offer or restructuring proposal have been finalised and communicated to Fitch, the affected notes may be lowered to 'Csf', indicating imminent default.

On Execution

If the DDE executes successfully, the note rating is lowered to 'Dsf'. This reflects Fitch's view that a DDE has occurred and communicates to the market at large that the agency regards the DDE as a default.

Post-Execution

Immediately after the effective date of the DDE, the note rating is raised from 'Dsf' and re-rated to a level reflecting the structure as it exists after the DDE. Any new note issued, or existing notes restructured in a DDE, will be rated purely on the transaction's credit profile after the restructuring or exchange, coupled with any structural and/or legal considerations related to the specific issuance.

As a result of the exchange, new notes, which replace the previous notes that are extinguished, may be issued. In these instances, the newly issued notes are assigned a new rating on the effective date of the DDE. Conversely, the rating of the extinguished notes, having been lowered to 'Dsf' on the effective date of the DDE (as described above), is withdrawn.

Old notes that remain outstanding, but with restructured terms and conditions, are re-rated to reflect the agency's opinion regarding the new credit profile of the notes, after the DDE has been executed. The fact that any note issue was a product of a DDE is not relevant to the current rating.

Appendix 4: Rating Caps and Limitations

Fitch may view certain characteristics of SF transactions to be incompatible with certain rating categories. Fitch's ratings may therefore be subject to a rating cap. Limitations may be such that it is not possible to rate the notes. This section discusses factors that influence the application of caps. It does not define highly prescriptive and granular rules that apply in all circumstances, due to the variations in SF asset classes. Specific rating caps in an asset class or market sector will be specified in the related sector-specific criteria reports where applied. Where specific caps are applicable based on sector-specific criteria, the sector-specific criteria take precedence over the criteria published in this report.

This section provides a high level framework of the principles Fitch's SF analysts will apply to assess transactions. In certain cases, transactions will not achieve high investment-grade categories (ratings at 'AA' or higher) on principle, regardless of the degree of credit protection or structural mitigation around the notes. Rating caps may be imposed at any rating level, depending on a sector or transaction's individual circumstances.

Rating cap considerations may apply to both national and international scale ratings. However, cap levels for national scale ratings will consider the specific circumstances of the individual country and its national rating scale, which differ in nature to the international rating scale. Cap considerations may be less relevant for national ratings (for example, data availability across all sectors in the country may represent a systemic issue where the national scale applies). Nonetheless, instances that would fundamentally prevent any rating would apply equally to national scale ratings.

A transaction that does not meet all of the elements described in this appendix may still be rated, if Fitch determines that such transaction is compatible with the purpose and intent of Fitch's ratings and where Fitch believes it has sufficient information to form a credit view.

Portfolio and Data Quality

Under *Data Adequacy* above, Fitch explains the data it expects to receive and relies on for its transaction analysis.

Fitch expects to receive loan-by-loan data to perform its analysis for certain types of SF transactions. If specific loan-by-loan information is not available, significant market-wide data and other feedback from the originator may often provide proxy information.

While the length of time may be extensive, data may only cover a period of benign economic circumstances and may therefore be insufficient to develop robust assumptions. Such data for a long benign period allow limited insight into how performance may unfold during the downturn part of the cycle, especially since a sustained extended upcycle could itself be indicative of a "bubble". A lengthy benign period can mean a subsequent sustained and lengthy down-cycle as performance reverts toward the long-term trend.

Fitch also considers how product types have evolved over the period for which data has been provided with very long-dated assets. If product features have changed significantly, then data provided regarding assets that originated 20 or more years ago (and in some cases even a shorter period) may no longer provide sufficient insight as to how assets might perform in the future and, hence, become less relevant. Qualitative adjustments may be sufficient to address limited changes in product features, such that a rating cap may not apply. However, multiple layers of product change giving rise to several layers of additional risk would be more likely to lead to a rating cap unless there was supplementary data available to assess how such product evolution may influence future performance.

The relevance of historical data to ratings analysis may be a particular issue for transactions with "tail-end" market value risk (see *Excessive Market Value Exposure* section). This may be a function of a fundamental systemic shift whereby historical performance patterns may suddenly change, rendering risk assessments based on historical data less predictive of future performance. The modelling framework will be subject to additional scrutiny in these circumstances, with a particular focus on how short-term liquidity stresses could affect the transaction.

If an originator is not capable of producing historical performance data in line with the aforementioned description for the assets targeted for securitisation, the transaction proposal is unlikely to be rated by Fitch unless strong mitigants, such as relevant market-wide data, are available. In asset classes where the originator-specific underwriting criteria are expected to have a limited influence on the credit quality of the portfolio (eg syndicated loans or commercial property loans), available market data are expected to be more relevant than specific originator data.

Some transactions backed entirely by a portfolio of a certain type of assets may see a rating cap imposed where, for example, those assets have a particular attribute or emanate from a volatile sector of the market. However, there may be instances where a transaction is backed only by a proportion of such assets rather than the entire portfolio. In such a case, the transaction may still be eligible for ratings in the highest categories if, in Fitch's analysis, the relevant portion of the portfolio would effectively get no credit and would be expected to result in a total loss in rating scenarios above the level where a rating cap would ordinarily be expected to apply to such assets.

The sector-specific and bespoke criteria reports provide a detailed description on the type and extent of data expected for each asset class that is in line with the above principles.

Possible Mitigating Factors

If available originator data do not fully meet the aforementioned standards, representative proxy data can be considered to supplement otherwise inadequate historical originator performance data (either in terms of length of time or direct relevance) and the rating of a transaction. In addition to considering other sources of data, Fitch may also take into account any relevant information or industry perspective from other analytical groups within Fitch.

The proxy data may be data of other originators active in the same market or general industry-level data (in each case, the receivables that are the subject of the data should be similar in nature in terms of profile, as well as underwriting, origination and servicing standards). In limited cases, it might also include data available from different jurisdictions for similar asset classes, where the jurisdiction-specific aspects of the data can be addressed via reasonable adjustments.

If the jurisdiction where the receivables are originated has a significantly different legal and political regime compared to other jurisdictions where proxy data may be available, then it is unlikely that data from these jurisdictions can qualify as a proxy due to its limited relevance. In such cases, Fitch is unlikely to assign a rating.

For those ratings that proceed subject to a rating cap, based on limited data supplemented with proxy information, default, and loss severity assumptions will be higher than might usually be the case for the rating categories concerned if more extensive data were available. This reflects penalties applied in the analysis to mitigate increased uncertainty regarding the data used to derive rating assumptions, which will result in higher base case loss expectations and/or higher stress levels and higher credit enhancement than would be the case with more data.

In the event that there is only limited deficiency of historical data and/or proxy data available as described, it may be possible to rate a transaction without a rating cap. This limitation would be mitigated through applying significantly higher asset stresses to reach higher investment-grade categories. Such an approach can be taken either at a criteria level if significant wider market information is available or at a transaction-specific level.

Asset Concentration and Performance Volatility

Asset concentration concerns arise, for example, where the performance of a transaction is fully or materially dependent on a single industry, a small geographic region or very few obligors, especially if these are combined with a low credit quality. Transactions that are initially granular may become concentrated over time as they season and amortise. In such instances, a rating cap may apply. Fitch expects such risks to be addressed through structural mitigants such as credit enhancement floors in new transactions.

Industry Concentration

In case of industry concentration, Fitch would analyse the type of industry (or the small number of connected industries as the case may be) and analyse whether such industry is characterised

by very volatile asset performance, few players, or a large degree of uncertainty (for example, through the obsolescence of key technology). If such considerations are prevalent, a rating cap is likely to apply.

Examples where such an industry concentration rating cap may apply include, but are not limited to: (a) a securitisation of junior commercial property loans (B notes), particularly if in a single jurisdiction or related jurisdictions or regions; (b) a securitisation of shipping loans, particularly if strongly dependent on volatile spot freight rates; and (c) a securitisation backed by future cash flows from legal settlements owing from tobacco companies to US states (tobacco settlement ABS).

However, standard granular SF transactions are not considered to fall into the single industry category. Specific segments of the consumer finance market like auto and credit card loans or the commercial real estate market are characterised by markets with adequate performance data, such that robust analytical assumptions may be developed. While these sectors may be exposed to cyclical behaviour, Fitch typically does not apply a rating cap because of the relatively low degree of uncertainty associated with the robust performance data. Consumer finance transactions are also exposed to a large granular pool of obligors where an opinion can be formed on collective behaviour in stressed scenarios.

Similarly, a securitisation of a diversified portfolio of high- yield corporate obligations would also not be considered to be subject to the single industry exposure. While the lower credit quality assets are subject to higher performance volatility, a rating cap may not apply provided these transactions demonstrate significant industry and obligor diversification (thus sufficient overall stability). Despite this, rating caps may be applicable in certain granular asset classes where a transaction is concentrated in a sector or subsector in which historical performance has been volatile or unpredictable. These may include transactions backed by non-traditional or riskier credit quality assets combined with more aggressive underwriting practices and/or other risk factors. It may also include transactions concentrated in particular vintages originated in peak conditions where historical performance has been poor and highly volatile.

Prefunding and Revolving Periods

Additionally, transactions that have long prefunding or revolving periods or where the prefunding amounts are considered significant may not be rateable or may be subject to a cap on the maximum achievable rating. These structural features expose noteholders to additional risks with respect to a longer risk horizon. In particular, there is an increased risk of being subject to negative evolution in the credit profile of a collateral portfolio, particularly in the run up to the peak of a cycle, with the risk of increased losses during a subsequent downturn.

Fitch may also have concerns regarding the incentives of transaction parties (see *Incentives of Transaction Parties* below) for revolving or managed transactions where the collateral may significantly change over time and originators or managers may have the incentive to sell or substitute low quality assets into the portfolio to maintain short-term funding to the company. While eligibility criteria typically provide some protection against this, they usually do not fully address a material misalignment of interests. Depending on transaction-specific arrangements to address such concerns, a rating cap may apply or the transaction may not be rateable.

Excess Spread Notes and Excess Spread Dependence

Excess spread notes are defined as capitalised notes issued in addition to the principal balance of the receivables and the balance of cash reserves as at the initial cut-off date and where the repayment of those notes is dependent upon the availability of excess spread. The model-implied ratings of such notes are highly sensitive to cash flow modelling assumptions, especially prepayment rates. Ratings of such notes are capped at 'BB+sf'. Similarly, the ratings of those notes whose repayment excessively, even if not entirely, relies on excess spread may be constrained.

Geographic Concentration

Similarly, if significant geographic concentration is present, a rating cap may also apply. For example, this can be the case if an RMBS transaction is mainly backed by mortgages of secondary or holiday homes located in a region or an island dominated by tourism. Fitch believes

such a transaction may be subject to performance volatility that is inconsistent with 'AAAsf' ratings. Determination of whether a rating cap will apply will depend on a specific analysis of the economic profile of the region concerned. Less acute geographic concentrations can be addressed by specific analytical adjustments that would be described in related sector-specific or bespoke criteria or transaction-specific reports.

Obligor and Asset Concentration

Rating caps can also be applicable if a significant asset or obligor concentration is present in a transaction portfolio. However, this also depends on the asset class, type of obligor or asset concentration, and the asset credit quality. For example, the securitisation of a single high-quality New York commercial property is unlikely to be subject to a rating cap due to the expected high-quality liquidity and re-sale value of the underlying property. On the other hand, a transaction backed by unsecured debt from a small pool of 'BBB' rated corporate obligors is unlikely to achieve a rating above 'Asf', as opposed to more granular transactions.

Asset or obligor concentration risk may arise in transactions that are initially granular but experience increased small pool or loan count concentration over time. Increased tail-end credit enhancement targets may be one way of mitigating this risk as transactions season and amortise. Fitch will apply rating caps for transactions that could experience such loan count concentration and where the transactions lack any type of structural mitigants to offset potentially increased performance volatility as the pool size declines.

Legal Terms and Conditions

Fitch generally assigns ratings to SF instruments that address the likelihood of receiving payments in accordance with the terms and conditions on which investors make their investment, i.e. in accordance with the terms and conditions of the transaction documents.

However, the terms and conditions can include elements that Fitch deems incompatible with high investment-grade ratings, particularly at the 'AAAsf' level, which would result in ratings being capped or limited. Some elements may be incompatible with any rating being assigned. Examples include, but are not limited to, those described in the subsections below.

Deferability of Notes

Fitch's SF ratings address the likelihood of receiving payments in accordance with the terms and conditions on which the investor makes its investment. This means that, for principal repayment, a Fitch rating addresses the repayment by the legal final maturity of the note (unless there is a pre-defined principal repayment schedule that would represent an event of default if not met).

Fitch will not assign international scale category ratings of 'AAAsf' or 'AAsf', or national scale ratings equivalent to these ratings, to notes that it expects would defer interest under stress scenarios associated with those ratings, even if permitted under the terms of the documents. Fitch will assign international scale category ratings of 'Asf' or 'BBBsf', or corresponding national scale ratings, for bonds that are projected to incur deferrals under an expected case scenario (which in the absence of a published "expected case scenario" will refer to a 'Bsf' scenario) only if the following conditions are met.

- Deferrals are permitted under the terms of the documents;
- Deferrals must be fully recovered under the terms of the documents well in advance of the legal final maturity in the rating scenario associated with the rating assigned to the note;
- The deferral period is not deemed excessive;
- Noteholders are viewed as being in a substantially similar economic position as if deferral had not occurred; and
- Noteholders are given clear indications that deferrals may occur (e.g. notes are titled "deferrable notes" or deferral is outlined as a risk factor of the notes in the offering documents).

Fitch will review cash flow results or similar analysis to assess the likelihood and frequency of interest deferrals in expected and stress scenario cases. In each case, Fitch will explain in its rating communication if the rated notes can, according to the notes' terms, defer or capitalise interest, if, according to the rating analysis, deferral is expected to occur and whether ratings have been capped as a result.

Certain Note Event of Defaults

Certain transactions may underperform in relation to Fitch's initial expectations, resulting in the occurrence of a note event of default. However, despite this, the note event of default may not be expected to result in any change to the allocation of transaction cash flows nor result in any interest or principal loss to the security, according to Fitch's current expectations, provided the transaction continues to maturity. While such events may not affect Fitch's credit analysis, nevertheless they are usually indicative of some form of performance stress.

In such circumstances, higher investment-grade ratings will generally not be achievable in cases where a transaction may have entered a note event of default due to the breach of a trigger but is otherwise performing within Fitch's expectations. Such note event of default triggers are often linked to overcollateralisation or coverage ratio tests that are prevalent, for example, in SF CDO transactions. Note events of default may continue to be unremedied for the life of the transaction if no enforcement action is taken by the majority of the controlling class.

Conditional Reduction of Interest and/or Principal

Fitch has been approached with transactions where the terms and conditions specify the reduction of an interest distribution and/or the reduction of principal proceeds, subject to certain credit events (for example, the reduction in an interest rate coupon if a sovereign credit defaults – thereby embedding credit risk within the definition of the interest coupon). In such cases, when assigning SF ratings, Fitch would depart from the principle of rating to the documents and will also consider the likelihood of such a conditional event occurring in combination with other structural arrangements.

This is because, in such circumstances, a credit rating opinion delivered on the form of the transaction as described in the transaction documents would not effectively express an opinion on the substance of the entire credit profile of the transaction when considered as a whole (i.e. Fitch would apply the principle of "substance over form" in such cases). This could result in a rating cap or make a transaction not rateable at all.

In instances where receipt of an interest coupon (or part of an interest coupon) is conditional on credit risk (for example, the earlier example of the reduction of a coupon on the default of a sovereign credit), Fitch's rating will address the credit risk embedded in the interest coupon as well as the return of principal. This is because a credit opinion can be formed regarding the likelihood of the conditional reduction in the interest coupon. Therefore, the rating would be capped or limited by the credit position of the sovereign credit if lower than that of the entity that has the obligation to make interest and principal payments.

Fitch has also been approached to rate SF notes where the interest rate coupon or principal is market linked through dependence on the performance of a market or credit index (for example, an equity index such as iTraxx). Fitch would not rate such a transaction, because it would be unable to assess the substance of the market value exposure (see *Excessive Market Value Exposure*).

For clarification, this does not apply (and rating caps are not applicable) if interest distribution amounts are variable because payments are based on a margin over a floating interest rate index (such as Libor) or inflation indices.

Similarly, in cases where a note coupon payment is based on the outstanding note balance less write-downs or where coupon payments on a given interest payment date are permanently extinguished based on the occurrence of certain credit-related events (e.g. level of defaults or losses), Fitch would depart from the principle of rating to the documents. Fitch would model such structures according to the transaction documentation and will only assign a rating if in the relevant rating scenario principal and interest are paid in full and the trigger event for the credit-related reduction in interest payments is not expected to occur during the life of the note in the relevant rating scenario.

This is, for example, the case of those structures where the coupon payment is not based on the outstanding note principal balance of the note but on the so called "outstanding stated note principal balance" (i.e. outstanding note principal balance less charge-offs or, alternatively, less the outstanding principal deficiently ledger (PDL)) or whose coupon payments are not made when the stated balance of the note is zero. In those instances, Fitch would only assign a rating if in the relevant rating scenario the coupon payment is not affected by the presence of charge-offs (or PDL).

Other examples are the two-stage payment synthetic structures described in *Appendix 5*.

Generally, Fitch would be more concerned about a conditional reduction of principal payments than interest payments, although either can, in Fitch's view, lead to a rating cap or make a note not rateable.

Net WAC Caps

Net weighted average coupon (WAC) caps, which cap the interest due on certain tranches to the level of the WA interest rate owed on all assets, are an example of a conditional reduction of payments, eg the interest distributions can be reduced, capped, or deferred in adverse interest rate or prepayment scenarios. Net WAC caps do not result from credit-related issues, aside from payment reductions related to established loan servicing standards (such as distressed loan modifications in US RMBS and US CMBS) or limited reductions from delinquency in some US RMBS structures. Where securitisation markets have evolved with net WAC caps or similar features as an established market standard (ie in US RMBS and US CMBS), Fitch believes that the limitations of these features are widely accepted and well understood by market participants, including investors.

In such cases, Fitch's rating opinion does not address the likelihood of receipt of any interest cash flows that might exceed the net WAC cap or similar features, nor would such features be a cause for a rating to be capped. Fitch would expect that the consequences of these features are clearly explained in transaction documentation, and these features would not give rise to any conditional reduction in payments as a result of credit-related issues, such as reduced asset revenues owing to obligor default.

In contrast, in securitisation markets or sectors where net WAC caps or similar features have not been used, where Fitch believes the concept is not familiar to market participants and where it also believes the prospect for inconsistencies between ratings in the sector could arise, Fitch will test for receipt of liability-side cash flows gross of the conditional reduction (eg in excess of the net WAC cap) in its rating analysis, or consider applying rating caps to notes subject to a net WAC cap.

Principal-Only Ratings and Principal-Protected Notes

Occasionally, Fitch assigns ratings that only address the ultimate payment of the principal at or before the maturity and do not include an opinion on the ongoing or ultimate payment of any interest distribution. This will typically be the case where no coupon is specified (eg zero-coupon notes). Fitch will not assign principal-only ratings where an interest coupon for a note exists.

For principal-protected notes, the principal is typically protected by a pledged asset or benefits from the guarantee of the sponsoring bank. Such protection would typically be limited to the creditworthiness of the guarantor and terms of the guarantee. Additionally, Fitch can consider applying rating caps to certain principal-protected notes where the transaction structure is deemed too complex. Any such limitation of the rating will be specified in Fitch's rating communication.

Step-Up Interest Coupons

SF transactions sometimes include arrangements for a step-up interest coupon, or increased interest margin, which is intended to provide an incentive for the originator or equity tranche holder to exercise an early prepayment option at a "clean-up" call for the transaction. Usually such step-up coupons are part of the defined coupon and are paid *pari passu* with the given note class and their non-payment on senior notes would cause a payment default. In its analysis, Fitch will assume that the clean-up call is not exercised and, therefore, the note coupon will step up and the step-up interest amounts are addressed in Fitch's analysis.

In contrast, Fitch may be approached with transaction structures where the step-up coupon would be paid subordinate in a transaction waterfall (ie junior to the lowest-rated note) and where the non-payment of the step-up coupon would not cause an event of default for the transaction, according to the transaction documentation. In such instances, Fitch will consider not addressing the subordinated step-up interest payments in its rating opinion, depending on the circumstances.

Fitch will expect to exclude such cash flows from its rating analysis where securitisation markets or sectors have evolved with this subordinated feature being an established market convention, where Fitch believes investors do not expect to receive such cash flows and where there has been clear and prominent disclosure in transaction documentation as to their subordinated nature and exclusion from events of default. In such instances, Fitch believes investors will have greater use for a rating opinion that only addresses the interest and principal cash flows that they actually expect to receive. Any such limitation of the rating will be clearly specified in the relevant sector-specific criteria and in Fitch's rating communication.

Practical Application – Fitch will consider not assigning ratings where there is a greater potential for the rating to be misinterpreted, misused, or misrepresented. Therefore, ratings assigned to interest-only (IO) securities will be directly linked to the credit risk of the referenced tranche or tranches:

- IOs that reference a single tranche will be rated at the same level as the referenced tranche;
- IOs that reference multiple tranches will be rated at the level of the lowest referenced tranche whose payable interest has an impact on the IO payments; and
- IOs that only reference: (i) non-rated tranches; (ii) the entire capital structure where the lowest referenced tranche is non-rated; or (iii) tranches for which no cash flows are currently present or will be in the future will not be assigned ratings by Fitch.

In contrast, where such a feature has not been used in a particular subsector where Fitch believes disclosure is unclear or where the prospect for investor misunderstanding is high, Fitch could choose to include the step-up coupon in its rating opinion so as to allow for consistency in the basis for ratings across that subsector. Where step-up coupons are included in the rating opinion, they will be included in Fitch's cash flow analysis. In cases where a step-up coupon is paid subordinate in a transaction waterfall, the rating will be limited by the reduced likelihood of receiving this payment at the subordinate level. This can lead to a rating cap consistent with the payment of the subordinate payment, or make such notes not rateable.

Additionally, Fitch will not assign interest-only ratings where principal cash flows exist.

Ratings with Limited Credit Value

Previously, Fitch has been asked to assign ratings that are non-traditional or have no or limited credit substance due to the defined terms and conditions of the notes concerned. Examples are mortgage early redemption certificates, where investors will receive distributions only to the extent that early redemption payments are received by the SPV. The rating can only address the mechanics of whether the distribution of funds from early redemption will happen, but not express any form of credit opinion as to the extent of such redemptions. Such notes would only be subject to rating action resulting from issues related to the defined terms and conditions rather than any real credit opinion. Therefore, such a rating would be of limited value from a credit perspective and will not be assigned at any rating category.

As a general guide, if Fitch cannot envision scenarios where a note's ratings may be subject to rating actions due to credit issues, it is very likely that the rating would be considered to lack any real substance. In such situations, no Fitch rating will be assigned.

Lack of Transaction Economic Substance

It is Fitch's practice not to rate transactions that exist, in the agency's view, solely for tax and/or accounting considerations without serving any fundamental economic purpose. While tax and/or financial reporting considerations are often one of a number of motivating factors for

issuers of SF transactions, such considerations will generally be complementary to a principal economic motivation. In the event that there appears to be no economic substance to the structures, apart from tax-avoidance schemes or accounting window-dressing, Fitch will not rate the transaction. While the agency may have no reason to believe such transactions are illegal in any way, such structures are not compatible with the purpose and intent of Fitch's ratings.

Excessive Market Value Exposure

Fitch will generally not rate SF transactions with material exposure to market value risk, but its Fund and Asset Management team can rate certain market value structures under the [Closed-End Funds and Market Value Structures Rating Criteria](#).

In addition, a rating cap may be applied to transaction structures that: (a) rely on a servicer's ability to achieve a loan workout or to liquidate collateral in an orderly fashion in the most stressed environments and/or a very limited time horizon (e.g. as a transaction approaches its legal final maturity date); (b) include assets with limited trading, pricing, and liquidity history; or (c) include assets with knock-out market value triggers in which the breach of a pre-specified trigger (albeit usually set far from current market levels) will result in a default of the transaction with often nominal recoveries.

In Fitch's view, these examples demonstrate a level of "tail-end" risk (or risk of extreme events) that – particularly with respect to market price movements – is deemed to be incompatible with high investment-grade ratings. As a result, the ratings are capped as a matter of principle. No level of data, credit protection, or other mitigants will achieve ratings higher than the cap. Unlike asset performance data, historical data with respect to market price movements may provide less insight into the future path of such price movements.

The rating cap is largely driven by the limitations of effectively assessing the liquidation prospects in the tail-risk scenarios. For certain assets, forced liquidation prices in most severe scenarios may be so low such that no credit could be given to them in such an environment.

Sovereign Dependency

Sovereign governments and their agents can affect the operating environment for private entities and SF transactions in many ways. While the securitisation industry has developed a number of techniques to mitigate these effects, Fitch believes it is ultimately not possible to entirely eliminate the risk that sovereign credit matters will affect the performance of an SF transaction. A high level of sovereign default risk raises the prospect of extreme events occurring in a country and reduces the certainty of performance projections for SF assets. For this reason, a rating cap will be applied in certain circumstances. Fitch's [Structured Finance and Covered Bonds Country Risk Rating Criteria](#) address sovereign risk in both developed and emerging markets, as well as transactions with multi-jurisdictional structures.

Legal Uncertainties and Pending Litigation

Rating caps can also be applicable where there are concerns regarding the robustness of the legal framework affecting a particular asset class or a particular jurisdiction. One means of assessing this is to examine the extent and materiality of reservations, qualifications, and assumptions in legal opinions, which may weaken the views expressed therein. Whether any rating cap is applicable – and at what rating level – will be influenced by the likelihood of the legal event, subject to reservations or qualifications. Where insufficient comfort can be obtained regarding salient legal issues, it is unlikely that Fitch will assign a rating at any level.

Fitch may also cap ratings if the agency expects that its ability to assess the impact of transaction costs and/or cash flows is impeded to a material extent by a pending litigation affecting transaction parties.

Third-Party Dependencies

In addition to sovereign dependency, counterparty risk and certain operational dependencies described earlier in the report, there could be other instances where the SF transaction performance can depend to a substantial degree on the continued performance of a third party (eg the originator, seller or others). This can result in material credit exposure to that third party

or provide operational dependency if the third party performs crucial functions that may not be replaceable and are crucial to the transaction performance.

In such instances, the rating can be capped at the level relative to the relevant third party or at a certain level above the originator's rating. Examples include, but are not limited to, the case where a significant percentage of the pool comprises employee loans tied to one originator. Another example would be where the true sale or a clear segregation of the assets cannot be achieved or where there is no clear legal comfort that such asset segregation is effective, absent any structural mitigants.

Ratings caps can also apply where there is a material reliance on the ongoing operations of the originator or aggregator. This is the case in future flow transactions, which securitise the cash flow originating from a specific business line of a bank or company that produces goods or services for (foreign) obligors. Fitch assesses the risk through a going concern assessment score that allows for a rating between zero and six notches above the local currency IDR of the originator (for more details, refer to the [Future Flow Securitization Rating Criteria](#)).

This will also apply to revolving structures where there are doubts about the originator maintaining the same quality of origination standards or ensuring data integrity.

Incentives of Transaction Parties

Ideally, the incentives of transaction parties are aligned with the interests of the noteholders. However, this is not always the case and some misalignments of interests or incentives can be so material that a rating cap would apply or ratings would not be achievable at any rating level. For example, especially for originators that are in some form of financial distress (as may be indicated by a low rating), an analysis of the incentive structure of the originator and any counterparty dependency is needed. This could be also the case when the deal structure increases the risk of misalignments of interests or incentives between the various transaction parties (see *Moral Hazard Risk* in Appendix 5 for a detailed example).

Issuers may also sometimes look to include provisions in transactions that allow for optionality on the part of the originator or other counterparties. How transaction counterparties may behave when exercising such optionality provisions is a consideration when assigning ratings to SF transactions. Where a specific action of a counterparty (other than the investor[s]) could lead to a significant note impairment, Fitch would not be able to rate the transaction at any level. Examples for this situation would be: (a) the option of an originator to call the transaction notes (or repurchase all the assets) at a price that could lead to a loss of either interest or principal for the noteholders; or (b) the ability to redeem notes at any level chosen by the originator, thereby potentially altering the credit protection position across the structure.

Appendix 5: Synthetic Securitisations

Synthetic securitisations (as opposed to true sale securitisations) are transactions that reference the performance of a portfolio of assets through credit default swaps (CDS), guarantees or similar instruments and do not involve the true sale or any other form of asset transfer.

The risk of the reference portfolio is transferred by an originator/asset-holder/protection buyer (the protection buyer) to an investor/protection seller (the protection seller), who has the obligation to make protection payments to the protection buyer upon the occurrence of certain “credit events” (see *Assessing Credit Events and Protection Payments*) in the reference portfolio. The protection seller receives in exchange a periodic or an upfront payment (the premium) from the protection buyer.

Funded vs Unfunded

In typical fully funded synthetic structures, the protection seller is an SPV that funds itself by selling interest-bearing notes to investors, who ultimately bear the credit risk of the reference pool.

The cash advanced by investors is deposited in an account of the SPV and may be invested to minimise the cost of holding cash (see *Charged Assets in Funded Structures*). Such deposits are the security for the SPV's obligations to the protection buyer, and for its obligations to repay principal of its notes (which are normally paid when the reference pool amortizes and protection no longer applies to the amortized amount).

The SPV uses the premium paid by the protection buyer and any interest earned on its deposits and/or investments to pay the interest on the notes. If the protection buyer fails to pay the premium, the transaction is normally automatically terminated and the SPV returns the deposited funds to the investors.

The protection buyer raises a claim to the SPV once an asset in the reference portfolio has suffered a credit event. The SPV satisfies the protection buyer's claim using the deposited funds. In some transactions, the protection buyer's claim to the SPV may be limited to the amount of protection payments that exceed a threshold specified in the transaction documentation. For example, loss protection payments on loans affected by a credit event may be limited to the cumulative amount of loan losses that exceeds a percentage of the reference portfolio.

At the notes' maturity date, investors will receive a principal payment corresponding to the cash paid to buy the notes less the payments made by the SPV to cover for the credit events less any amounts paid to amortize the notes during the life of the transaction.

Fitch considers synthetic transactions where notes are issued directly by the protection buyer, and cash advanced by investors is therefore not held in an account of the SPV, as particular types of funded structures. This is the case, for instance, of earlier US credit-risk-transfer and certain US on-balance-sheet risk transfer transactions.

Unfunded transactions do not involve any issuance of notes and investors take the protection seller role by entering into CDS, guarantees (or similar unfunded instruments) with the protection buyer.

Partly funded synthetic transactions involve a mix of the unfunded and funded structure types.

Balance Sheet vs Arbitrage

Balance-sheet securitizations differ from arbitrage deals because they involve assets sitting on the protection buyer's balance sheet. The protection buyer's goal is primarily the risk transfer and - eventually - the related capital relief of the portfolio.

In an arbitrage deal the protection buyer aims to gain an interest margin by providing investors with customised risk/return profiles. These are achieved by underwriting CDS on reference assets that do not necessarily sit on the protection buyer balance sheet (naked CDS) and therefore are not a reflection of the protection buyer's risk exposure or business in general.

Rating Analysis

When it rates funded synthetic structures, Fitch expresses an opinion on the likelihood of default on the payment of interest and principal due under the terms of the notes issued by the SPV.

When the ratings are assigned to CDS or guarantees (or similar unfunded instruments), they address the likelihood of a claim being made by the protection buyer, and the likelihood that the protection seller will receive the premium for the duration of the credit protection period (i.e. up to the deal maturity or to the point of early termination). For avoidance of doubt, the ratings do not represent a counterparty rating on the protection seller or its financial capacity to meet credit event claims.

For transactions that hinge on “physical settlement” CDS or similar arrangements where the protection buyer claim consists in the par value of the defaulted assets (as opposed to the loss on the asset) and triggers the delivery of the defaulted assets to investors (directly or through the SPV), Fitch’s ratings indicate the adequacy of the available credit enhancement against the risk of assets default, i.e. the “risk of assets being delivered to the investors”.

Assessing Credit Events and Protection Payments

Credit events and related protection payments tend to be connected with the concept of “asset loss” but their definitions vary across transactions, asset types and jurisdictions.

The starting point of Fitch’s rating analysis is the sector-specific criteria applicable to the reference portfolio. As the definitions of credit events and of the protection payments resulting therefrom are heterogeneous, Fitch will consider any difference between the transaction’s definitions and the variables analyzed by its sector criteria and adjust its analysis to account for material differences.

For example, most of Fitch criteria assess the ultimate asset losses (the loss on defaulted assets once the workout has been completed), while the definitions of credit events and of the related protection payments could embed different loss designations, for example by including asset restructuring as losses or a different arrears period than the one used in our criteria for defaults.

Another common difference is that Fitch criteria normally assess ultimate losses over the entire life of the portfolio, while the tenor of a synthetic transaction can be shorter than its reference portfolio’s. In these instances, Fitch may adjust its sector-specific criteria assumptions to reflect the shorter risk horizon. This may include reducing the portfolio “lifetime loss expectation” and applying default distributions that do not necessarily match with those specified in the reference sector-specific criteria.

Where not disclosed in the sector-specific criteria, Fitch will disclose adjustments to the analytical assumptions in the transaction research. These adjustments will lead to a criteria variation from the sector-specific criteria.

Moral Hazard Risk

The asymmetry of information and the opposing economic interests of the protection buyer and the protection seller can result in moral hazard issues. Fitch will not assign ratings to deals where the agency believes moral hazard risks are not adequately mitigated.

Moral hazard issues may to a large extent be addressed by appointing at closing a reputable independent third party to monitor the risks detailed below.

Other mitigants of moral hazard risk include:

- Alignment of the credit events and of the protection payments resulting therefrom with the protection buyer’s business practices (see below).
- Clearly documented definitions of credit events and of the related protection payments, with limited degrees of freedom for the servicer. In this context, Fitch believes it is unlikely that credit events that depend on regulatory provisions will offer room for major moral hazard issues.

- Objective and transparent processes for verifying asset eligibility, identifying credit events and quantifying the related protection payments.
- Homogeneous servicing process that do not allow the servicer's employees to distinguish between protected and non-protected assets.
- Comprehensive and verifiable servicing reporting.
- Independent data audit or sample due diligence at closing.
- Regulatory oversight and reputation of the protection buyer.

Credit Event Definition and Claim Eligibility

Fitch believes moral hazard risk is less pronounced when the credit events and the related protection payments are aligned with the protection buyer's business practices. This is the case for example when the payment upon a credit event is defined as the "asset loss" and that asset loss matches the actual loss at the end of the workout or the protection buyer's accounting practices for recording losses.

Some transactions assume a fixed loss given default, i.e. the protection buyer can make a fixed claim upon the default of an asset, regardless of the outcome of its workout. In Fitch's view, this feature alone does not remove moral hazard risk, as the protection buyer/servicer may take advantage of information asymmetry and negotiate a higher fixed claim than the loss given default it expects on the assets, distorting its incentives in managing credit events.

In the absence of adequate mitigants such as an independent data audit, a sample due diligence at closing or a third-party verification upon credit event, moral hazard issues may also arise where asset eligibility for protection is assessed by the protection buyer only.

Servicing

Synthetic securitisations' servicing arrangements normally limit the investors' ability to influence servicing and to take actions in the case of bad servicing performance (i.e. inefficient or biased servicing) as, among other things they do not normally provide for a servicer replacement.

This risk is particularly prominent where the reference portfolio consists of few large and/or complex assets such as synthetic CMBS, where the protection buyer retains certain rights as lender of record (e.g. the right to appoint an administrator) that in a true sale deal would be transferred to the investors as "co-lenders of record". Where the protection buyer has such a privileged position, Fitch does not regard the protection buyer's reputation or the high-profile/visibility of the transaction as a mitigant of moral hazard.

Adverse Selection Risk

Fitch will not assign ratings to transactions where it believes there is adverse selection that cannot be adequately incorporated in its analysis.

Adverse selection risk is less likely in balance-sheet deals than in arbitrage deals if the reference portfolio comprises randomly selected assets that belong to the protection buyer's core business, because the performance of the reference pool would be likely to mimic the performance of the protection buyer's remaining portfolio.

However, as for true sale transactions, adverse selection may also be present in balance-sheet deals. For example, adverse selection may be material when the reference portfolio comprises assets originated or purchased with the sole objective of transferring their risk through securitisation when the transaction is part of an exit strategy or more generally when the portfolio reflects only a niche or marginal business for the lender.

Default of the Protection Buyer

If the protection buyer defaults on the protection premium payment, this normally leads to an early termination of the transaction's credit protection period. In funded structures, the SPV would redeem the notes using proceeds from the charged assets (See *Charged Assets in Funded Structures*). However, investors remain exposed to the risk of not receiving their interest

payments, which typically depend on the premium payments or other obligations of the protection buyer.

When the interest payments to the noteholders depend on the premium payments or other obligations of the protection buyer, Fitch will cap its ratings at the protection buyer's rating, unless the resulting counterparty risk is mitigated.

In some funded deals, the risk is mitigated by collateralizing the exposure to the protection buyer (e.g. reserve funds or advanced premium payments). The collateral typically covers the interest payments due to the noteholders over the next payment period, and the time needed to early terminate the transaction upon the default of the protection buyer and redeem the notes.

In unfunded transactions the exposure to the protection buyer is often mitigated by making the protection seller's payments conditional on receipt of the premium.

The potential exposure to the protection buyer in synthetic deals envisaging a "two-stage payment structure" is described in *Two-Stage Payments, Deferrability of Notes and Conditional Reduction of Interest*.

Where the exposure to the protection buyer is so material that it cannot be mitigated, Fitch will cap the rating(s) at the protection buyer rating. This is the case for example of those transactions where the protection buyer is the issuer of the notes and the repayment of notes is an unsecured general obligation of the protection buyer (i.e. not collateralized by charged assets).

Charged Assets in Funded Structures

Funded transactions are exposed to the risk of losing money upon default of the SPV's account bank or investments. When the funds are invested in securities, they are also exposed to market value risk if the securities have to be liquidated ahead of maturity.

Fitch will analyse these risks and will apply rating constraints in accordance with *Charged Assets* and *Excessive Direct Counterparty Exposure* in its *Structured Finance and Covered Bonds Counterparty Rating Criteria*.

Termination Payments

An early termination of the CDS (or of the financial guarantee) following the default of the protection buyer may result in early termination costs due from the protection seller to the protection buyer. Fitch may assign ratings higher than the protection buyer's rating only:

- in funded and unfunded transactions where no early termination costs are due to the protection buyer under the term of the documentation; or
- in funded and unfunded transactions where the risk of senior termination costs to the protection buyer can be quantified upfront and factored in Fitch's analysis; or
- in funded transactions where the payment of the early termination costs to the protection buyer is subordinated to the redemption of the notes and there is sufficient legal comfort that the relevant transaction provisions ("flip clause") are enforceable.

For more details see *Structured Finance and Covered Bonds Counterparty Rating Criteria*.

If there are other early termination events that may result in senior termination costs but are not connected with the protection buyer default, Fitch will assign a rating only if those costs are quantifiable up front or sufficiently remote in the relevant rating scenario. For avoidance of doubt, termination events in relation to the protection seller default are out of the scope of the rating.

Cash Flow Modelling and Structural Features

Credit enhancement in synthetic deals normally consists of subordination and/or synthetic excess spread (XS), defined as any positive or negative component or adjustment to the credit events that cannot be assessed by considering the reference asset losses alone.

For example, a transaction could provide that the protection payments due by the protection seller will be reduced by a pre-defined percentage of the outstanding reference portfolio in the reference period or other forms of synthetic excess spread (the synthetic XS).

Fitch will analyse the deal's payments in a cash-flow model only when they could be detrimental or beneficial to the relevant credit rating. This could for example be the case where synthetic XS acts as a first layer of protection or structures with complex credit event definitions, complex note amortization structures or complex payment flows.

In such cases Fitch will analyse the deal using a financial model, which may be derived from the ones in use for true sale deals for the relevant asset class.

Depending on the structure, the relevant modelling assumptions (e.g. default distributions, asset margins and prepayment rate) may not match those in the reference sector-specific criteria. For example, Fitch may apply bespoke default distributions where the ratings benefit from synthetic XS or where synthetic XS is specifically structured to counter the stresses applicable to true sale transactions. In this latter case, Fitch may also decline to rate the transaction or apply a rating cap.

Two-Stage Payments, Deferability of Notes and Conditional Reduction of Interest

Under a two-stage payments structure, although the final claim of the protection buyer to the protection seller is defined as the ultimate asset loss (the loss on defaulted assets once the workout has been completed), the protection seller would first have to pre-fund a certain percentage of a defaulted exposure (the estimated loss under the documentation or the first-stage loss) when an asset default notice is served.

In the second stage, the final claim against the protection seller is determined by assessing the actual loss on the defaulted exposure (the ultimate loss). If the ultimate loss exceeds the first-stage loss, the protection seller will transfer additional funds to the protection buyer. If the first-stage loss exceeds the ultimate loss, the protection buyer will pay back the excess, plus interest (in some structures), to the protection seller.

Fitch's ratings for these structures address the likelihood of a final claim being made (i.e. payments at the end of the second stage) rather than a prefunding claim being made (i.e. payments at the end of the first stage). However, the ratings may be constrained by the additional risks that stem from the first-stage payments, namely the counterparty exposure to the protection buyer, the risk of loss of interests/premium and the risk of interest/premium deferral, as outlined below.

- If Fitch expects the protection buyer will have to make payments back to the protection seller in a specific rating scenario (i.e. if the loss Fitch associates with a specific rating scenario is lower than the first-stage loss), the resulting counterparty risk will constrain the ratings at the protection buyer's rating in the absence of adequate mitigants (e.g. up-front collateralization of the exposure to protection buyer or additional credit enhancement).
- The accumulation of asset default notices (i.e. payments in the first stage) may exceed the available credit enhancement and result in a reduction of the notional amount on which the protection seller interest/premium is calculated (in funded structures: the notes' balance). If the resulting interest loss is compensated at the second-stage payment, the compensation is part of the assessment of the exposure to the protection buyer discussed in the point above. If the loss of interest is not compensated at the second-stage payment, Fitch will consider it as a conditional reduction of interest that constrains the ratings (see Appendix 4 *Conditional Reduction of Interest and/or Principal*). In other words, Fitch will assign a certain rating only if, in the corresponding rating scenario, it does not expect a reduction of interest/premium by operation of the first-stage payments.
- Regardless of the presence of mitigants, these structures can achieve 'AA-sf' or higher ratings only if Fitch considers the interest deferral risk remote (see Appendix 4, *Deferability of Notes*).

When assessing the exposure to the protection buyer under a two-stage payment structure, Fitch may consider different assumptions from those assumed in the applicable sector-specific criteria.

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Criteria Type	Criteria Title	Publication Date	Criteria Report Link	Changes
Sector Specific	UK Income-Contingent Student Loans Rating Criteria	Jan 10, 2022	https://www.fitchratings.com/site/re/10190010	https://www.fitchratings.com/site/pr/10190228
Master	Non-Bank Financial Institutions Rating Criteria	Jan 31, 2022	https://www.fitchratings.com/site/re/10187597	https://www.fitchratings.com/site/pr/10191090
Sector Specific	Canada Residential Mortgage Rating Criteria	Feb 10, 2022	https://www.fitchratings.com/site/re/10192954	https://www.fitchratings.com/site/pr/10193447
Sector Specific	Global Container Lease ABS Rating Criteria	Feb 10, 2022	https://www.fitchratings.com/site/re/10193034	https://www.fitchratings.com/site/pr/10193176
Sector Specific	U.S. RMBS Cash Flow Analysis Criteria	Feb 15, 2022	https://www.fitchratings.com/site/re/10191839	https://www.fitchratings.com/site/pr/10191841
Sector Specific	U.S. RMBS Surveillance and Re-REMIC Rating Criteria	Feb 15, 2022	https://www.fitchratings.com/site/re/10192898	https://www.fitchratings.com/site/pr/10192899
Sector Specific	APAC Residential Mortgage Rating Criteria	Feb 16, 2022	https://www.fitchratings.com/site/re/10193488	https://www.fitchratings.com/site/pr/10193957
Sector Specific	Originator-Specific Residential Mortgage Analysis Rating Criteria	Feb 25, 2022	https://www.fitchratings.com/site/re/10194505	https://www.fitchratings.com/site/pr/10195066
Sector Specific	Asset-Backed Commercial Paper Rating Criteria	Feb 28, 2022	https://www.fitchratings.com/site/re/10193802	https://www.fitchratings.com/site/pr/10195274
Sector Specific	Exposure Draft: Transportation Infrastructure Rating Criteria	Feb 28, 2022	https://www.fitchratings.com/site/re/10178342	https://www.fitchratings.com/site/pr/10191188
Sector Specific	EMEA Equity Release Mortgage Rating Criteria	Mar 9, 2022	https://www.fitchratings.com/site/re/10193041	https://www.fitchratings.com/site/pr/10193040
Sector Specific	EMEA Equity Release Mortgage Rating Criteria Assumptions - Supplementary Data File	Mar 9, 2022	https://www.fitchratings.com/site/re/10193042	https://www.fitchratings.com/site/pr/10193040
Master	U.S. Affordable Housing Rating Criteria	Mar 9, 2022	https://www.fitchratings.com/site/re/10194808	https://www.fitchratings.com/site/pr/10194809
Sector Specific	Exposure Draft: UK RMBS Rating Criteria	Apr 5, 2022	https://www.fitchratings.com/site/re/10191720	https://www.fitchratings.com/site/pr/10197258
Cross Sector	Public-Sector Counterparty Obligations in PPP Transactions Rating Criteria	Apr 5, 2022	https://www.fitchratings.com/site/re/10198036	https://www.fitchratings.com/site/pr/10197985
Sector Specific	U.S. Public Finance Not-For-Profit Life Plan Community Rating Criteria	Apr 5, 2022	https://www.fitchratings.com/site/re/10196268	https://www.fitchratings.com/site/pr/10195987
Sector Specific	CLOs and Corporate CDOs Rating Criteria	Apr 6, 2022	https://www.fitchratings.com/site/re/10198421	https://www.fitchratings.com/site/pr/10198420
Sector Specific	Exposure Draft: China Residential Mortgage Rating Criteria	Apr 7, 2022	https://www.fitchratings.com/site/re/10193852	https://www.fitchratings.com/site/pr/10198253
Sector Specific	Exposure Draft: Netherlands Buy-To-Let RMBS Rating Criteria	Apr 7, 2022	https://www.fitchratings.com/site/re/10195104	https://www.fitchratings.com/site/pr/10198995
Sector Specific	Latin America RMBS Rating Criteria	Apr 7, 2022	https://www.fitchratings.com/site/re/10197897	https://www.fitchratings.com/site/pr/10197769
Sector Specific	North America and Asia-Pacific Multiborrower CMBS Surveillance Criteria	Apr 8, 2022	https://www.fitchratings.com/site/re/10197982	https://www.fitchratings.com/site/pr/10197861
Master	Sovereign Rating Criteria	Apr 11, 2022	https://www.fitchratings.com/site/re/10197130	https://www.fitchratings.com/site/pr/10197104
Master	Supranationals Rating Criteria	Apr 11, 2022	https://www.fitchratings.com/site/re/10197917	https://www.fitchratings.com/site/pr/10197770
Sector Specific	U.S. RMBS Rating Criteria	Apr 18, 2022	https://www.fitchratings.com/site/re/10198848	https://www.fitchratings.com/site/pr/10198570
Sector Specific	Exposure Draft: APAC Residential Mortgage Rating Criteria	Apr 27, 2022	https://www.fitchratings.com/site/re/10198949	https://www.fitchratings.com/site/pr/10200916
Sector Specific	Future Flow Securitization Rating Criteria	Apr 27, 2022	https://www.fitchratings.com/site/re/10199921	https://www.fitchratings.com/site/pr/10199806
Sector Specific	Transportation Infrastructure Rating Criteria	May 16, 2022	https://www.fitchratings.com/site/re/10200806	https://www.fitchratings.com/site/pr/10200805
Sector Specific	U.S. Federal Family Education Loan Program Student Loan ABS Rating Criteria	May 20, 2022	https://www.fitchratings.com/site/re/10201793	https://www.fitchratings.com/site/pr/10202635
Sector Specific	European RMBS Rating Criteria	May 23, 2022	https://www.fitchratings.com/site/re/10202440	https://www.fitchratings.com/site/pr/10202526
Master	U.S. Housing Finance Agency Loan Program Rating Criteria	May 23, 2022	https://www.fitchratings.com/site/re/10201621	https://www.fitchratings.com/site/pr/10201314
Sector Specific	UK RMBS Rating Criteria	May 23, 2022	https://www.fitchratings.com/site/re/10201663	https://www.fitchratings.com/site/pr/10201479
Sector Specific	Insurance-Linked Securities Rating Criteria	May 24, 2022	https://www.fitchratings.com/site/re/10202931	https://www.fitchratings.com/site/pr/10202978
Sector Specific	U.S. Utility Tariff/Stranded Cost Bonds Rating Criteria	May 25, 2022	https://www.fitchratings.com/site/re/10202490	https://www.fitchratings.com/site/pr/10203353
Sector Specific	APAC Residential Mortgage Rating Criteria	Jun 1, 2022	https://www.fitchratings.com/site/re/10202957	https://www.fitchratings.com/site/pr/10203251
Sector Specific	China Residential Mortgage Rating Criteria	Jun 1, 2022	https://www.fitchratings.com/site/re/10203176	https://www.fitchratings.com/site/pr/10203269
Sector Specific	Sports Facilities, Leagues and Teams Rating Criteria	Jun 1, 2022	https://www.fitchratings.com/site/re/10202739	https://www.fitchratings.com/site/pr/10202677
Master	Exposure Draft: Sovereign Rating Criteria	Jun 8, 2022	https://www.fitchratings.com/site/re/10201605	https://www.fitchratings.com/site/pr/10202381
Sector Specific	U.S. Public Finance Prepaid Energy Transaction Rating Criteria	Jun 10, 2022	https://www.fitchratings.com/site/re/10204095	https://www.fitchratings.com/site/pr/10204074
Sector Specific	CMBS Large Loan Rating Criteria	Jun 13, 2022	https://www.fitchratings.com/site/re/10203630	https://www.fitchratings.com/site/pr/10204058
Master	Exposure Draft: Infrastructure & Project Finance Rating Criteria	Jun 13, 2022	https://www.fitchratings.com/site/re/10202321	https://www.fitchratings.com/site/pr/10204357

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Master	Exposure Draft: Sector Navigators - Palm Oil	Jun 13, 2022	https://www.fitchratings.com/site/re/10196114	https://www.fitchratings.com/site/pr/10204481
Cross Sector	Sukuk Rating Criteria	Jun 13, 2022	https://www.fitchratings.com/site/re/10204221	https://www.fitchratings.com/site/pr/10204036
Sector Specific	Canada Residential Mortgage Rating Criteria	Jun 14, 2022	https://www.fitchratings.com/site/re/10204375	https://www.fitchratings.com/site/pr/10204390
Sector Specific	U.S. Military Housing Rating Criteria	Jun 22, 2022	https://www.fitchratings.com/site/re/10204417	https://www.fitchratings.com/site/pr/10204392
Sector Specific	U.S. Timeshare Loan ABS Rating Criteria	Jun 24, 2022	https://www.fitchratings.com/site/re/10205575	https://www.fitchratings.com/site/pr/10205836
Master	Exposure Draft: Covered Bonds Rating Criteria	Jul 4, 2022	https://www.fitchratings.com/site/re/10204052	https://www.fitchratings.com/site/pr/10206128
Master	Fitch’s Exposure Draft Covered Bonds Refinancing Spread Level Assumptions – Supplementary Data File	Jul 4, 2022	https://www.fitchratings.com/site/re/10205155	https://www.fitchratings.com/site/pr/10206128
Sector Specific	Exposure Draft: Salary-Assignment Loan ABS Rating Criteria	Jul 5, 2022	https://www.fitchratings.com/site/re/10203598	https://www.fitchratings.com/site/pr/10203641
Sector Specific	Exposure Draft: Digital Equipment Securitization Rating Criteria	Jul 6, 2022	https://www.fitchratings.com/site/re/10205249	https://www.fitchratings.com/site/pr/10206523
Sector Specific	Trade Receivables Securitization Rating Criteria	Jul 6, 2022	https://www.fitchratings.com/site/re/10204927	https://www.fitchratings.com/site/pr/10206522
Master	Sovereign Rating Criteria	Jul 11, 2022	https://www.fitchratings.com/site/re/10206577	https://www.fitchratings.com/site/pr/10206490
Sector Specific	Global Rental Fleet ABS Rating Criteria	Jul 12, 2022	https://www.fitchratings.com/site/re/10205901	https://www.fitchratings.com/site/pr/10207290
Master	Insurance Rating Criteria	Jul 15, 2022	https://www.fitchratings.com/site/re/10207005	https://www.fitchratings.com/site/pr/10206999
Master	Sector Navigators: Addendum to the Corporate Rating Criteria	Jul 15, 2022	https://www.fitchratings.com/site/re/10206943	https://www.fitchratings.com/site/pr/10206784
Cross Sector	Structured Finance and Covered Bonds Country Risk Rating Criteria	Jul 15, 2022	https://www.fitchratings.com/site/re/10207437	https://www.fitchratings.com/site/pr/10207609
Master	Infrastructure & Project Finance Rating Criteria	Jul 20, 2022	https://www.fitchratings.com/site/re/10207734	https://www.fitchratings.com/site/pr/10207929
Cross Sector	Structured Finance and Covered Bonds Counterparty Rating Criteria	Jul 29, 2022	https://www.fitchratings.com/site/re/10208116	https://www.fitchratings.com/site/pr/10208100
Cross Sector	Structured Finance and Covered Bonds Counterparty Rating Criteria: Derivative Addendum	Aug 1, 2022	https://www.fitchratings.com/site/re/10208970	https://www.fitchratings.com/site/pr/10208100
Sector Specific	Consumer ABS Rating Criteria	Aug 8, 2022	https://www.fitchratings.com/site/re/10208658	https://www.fitchratings.com/site/pr/10208488
Master	Covered Bonds Rating Criteria	Aug 8, 2022	https://www.fitchratings.com/site/re/10208775	https://www.fitchratings.com/site/pr/10208536
Master	Fitch's Covered Bonds Refinancing Spread Level Assumptions - Supplementary Data File	Aug 8, 2022	https://www.fitchratings.com/site/re/10209520	https://www.fitchratings.com/site/pr/10208536
Sector Specific	Private Equity Collateralized Fund Obligations (PE CFO) Rating Criteria	Aug 9, 2022	https://www.fitchratings.com/site/re/10208574	https://www.fitchratings.com/site/pr/10209568
Sector Specific	Digital Infrastructure Securitization Rating Criteria	Sep 6, 2022	https://www.fitchratings.com/site/re/10211420	https://www.fitchratings.com/site/pr/10211512
Master	Bank Rating Criteria	Sep 7, 2022	https://www.fitchratings.com/site/re/10211550	https://www.fitchratings.com/site/pr/10211919
Sector Specific	CLOs and Corporate CDOs Rating Criteria	Sep 8, 2022	https://www.fitchratings.com/site/re/10210578	https://www.fitchratings.com/site/pr/10210489
Sector Specific	Originator-Specific Residential Mortgage Analysis Rating Criteria	Sep 13, 2022	https://www.fitchratings.com/site/re/10212042	https://www.fitchratings.com/site/pr/10212011
Sector Specific	U.S. Public Finance Variable-Rate Demand Obligations and Commercial Paper Issued with External Liquidity Support Rating Criteria	Sep 16, 2022	https://www.fitchratings.com/site/re/10212680	https://www.fitchratings.com/site/pr/10212783
Sector Specific	Covered Bonds and CDOs Public Entities’ Asset Analysis Rating Criteria	Sep 21, 2022	https://www.fitchratings.com/site/re/10212950	https://www.fitchratings.com/site/pr/10213079
Sector Specific	U.S. Public Finance College and University Rating Criteria	Sep 22, 2022	https://www.fitchratings.com/site/re/10212635	https://www.fitchratings.com/site/pr/10213106
Sector Specific	Insurance-Linked Securities Rating Criteria	Sep 23, 2022	https://www.fitchratings.com/site/re/10213148	https://www.fitchratings.com/site/pr/10213427
Sector Specific	U.S. RMBS Loan Loss Model Criteria	Oct 7, 2022	https://www.fitchratings.com/site/re/10213976	https://www.fitchratings.com/site/pr/10214693
Sector Specific	Exposure Draft: EMEA CMBS and CRE Loan Rating Criteria	Oct 13, 2022	https://www.fitchratings.com/site/re/10211847	https://www.fitchratings.com/site/pr/10214619
Sector Specific	Dealer Floorplan ABS Rating Criteria	Oct 19, 2022	https://www.fitchratings.com/site/re/10215648	https://www.fitchratings.com/site/pr/10215788
Sector Specific	Private Equity Collateralized Fund Obligations (PE CFO) Rating Criteria	Oct 19, 2022	https://www.fitchratings.com/site/re/10215559	https://www.fitchratings.com/site/pr/10215435
Sector Specific	U.S. Equipment Lease and Loan ABS Rating Criteria	Oct 25, 2022	https://www.fitchratings.com/site/re/10215321	https://www.fitchratings.com/site/pr/10215803
Master	Corporate Rating Criteria	Oct 28, 2022	https://www.fitchratings.com/site/re/10214373	https://www.fitchratings.com/site/pr/10215573
Sector Specific	Originator-Specific Residential Mortgage Analysis Rating Criteria	Oct 28, 2022	https://www.fitchratings.com/site/re/10216404	https://www.fitchratings.com/site/pr/10216176
Sector Specific	Originator-Specific Residential Mortgage Analysis Rating Criteria – Supplementary Data File	Oct 28, 2022	https://www.fitchratings.com/site/re/10216827	https://www.fitchratings.com/site/pr/10216176

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Master	Sector Navigators: Addendum to the Corporate Rating Criteria	Oct 28, 2022	https://www.fitchratings.com/site/re/10214368	https://www.fitchratings.com/site/pr/10215573	
Sector Specific	Utility Credit Rights Securitisation Rating Criteria	Nov 7, 2022	https://www.fitchratings.com/site/re/10217512	https://www.fitchratings.com/site/pr/10217425	
Sector Specific	European RMBS Rating Criteria	Nov 11, 2022	https://www.fitchratings.com/site/re/10218110	https://www.fitchratings.com/site/pr/10218005	
Sector Specific	Exposure Draft: Iberian Recovery Rate Assumptions Rating Criteria	Nov 11, 2022	https://www.fitchratings.com/site/re/10216157	https://www.fitchratings.com/site/pr/10217623	
Master	Covered Bonds Ratings Criteria	Nov 22, 2022	https://www.fitchratings.com/site/re/10218385	https://www.fitchratings.com/site/pr/10218825	
Cross Sector	Non-Performing Loans Securitisations Rating Criteria	Dec 1, 2022	https://www.fitchratings.com/site/re/10219922	https://www.fitchratings.com/site/pr/10219926	
Cross Sector	Non-Performing Loans Securitisations Rating Criteria - Supplementary Data File	Dec 1, 2022	https://www.fitchratings.com/site/re/10219934	https://www.fitchratings.com/site/pr/10219926	
Sector Specific	Corporates Exceeding the Country Ceiling Criteria	Dec 8, 2022	https://www.fitchratings.com/site/re/10218680	https://www.fitchratings.com/site/pr/10218573	
Sector Specific	Exposure Draft: Aircraft Operating Lease ABS Rating Criteria	Dec 14, 2022	https://www.fitchratings.com/site/re/10219236	https://www.fitchratings.com/site/pr/10221764	
Sector Specific	U.S. Trust Preferred CDOs Surveillance Rating Criteria	Dec 14, 2022	https://www.fitchratings.com/site/re/10221434	https://www.fitchratings.com/site/pr/10221504	
Sector Specific	Exposure Draft: Aircraft Enhanced Equipment Trust Certificates Rating Criteria	Dec 15, 2022	https://www.fitchratings.com/site/re/10219149	https://www.fitchratings.com/site/pr/10221906	
Sector Specific	EMEA CMBS and CRE Loan Rating Criteria	Dec 16, 2022	https://www.fitchratings.com/site/re/10221213	https://www.fitchratings.com/site/pr/10221350	
Sector Specific	European RMBS Rating Criteria	Dec 16, 2022	https://www.fitchratings.com/site/re/10221286	https://www.fitchratings.com/site/pr/10221385	
Cross Sector	Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria	Dec 28, 2022	https://www.fitchratings.com/site/re/10222401	https://www.fitchratings.com/site/pr/10222590	