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Request For Comment: Global Methodology And Assumptions For CLOs And Corporate CDOs

April 10, 2019

(***Editor's Note:*** *This article, published April 10, 2019, has been superseded by "Global Methodology And Assumptions For CLOs And Corporate CDOs," published June 21, 2019.)*

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OVERVIEW AND SCOPE

1. S&P Global Ratings is proposing revisions to its methodologies and assumptions for rating corporate cash flow and synthetic collateralized debt obligations (CDOs) to incorporate the most recent performance data while maintaining consistency of these criteria with our rating definitions, and to take into account the evolution of the CDO market over the past decade. Today, nearly a decade on from when we introduced the current CLO rating framework using data up to 2008, we have 10 years of additional data on corporate ratings performance. In addition, with the CLO 1.0 transactions (those CLOs rated before the global financial crisis) almost fully redeemed, we have a better view of CLO performance over the past 20-plus years globally--a period that spanned several economic downturns. The proposed changes in this request for comment (RFC) article reflect these facts, as well as provide an update and simplification of our rating approach (see "Credit FAQ: Understanding S&P Global Ratings' Request For Comment On Proposed Changes To Its CLO And Corporate CDO Criteria," April 10, 2019).
2. These proposed criteria should be read in conjunction with "Global Framework For Cash Flow Analysis Of Structured Finance Securities," published Oct. 9, 2014 (the global cash flow criteria), and with the related guidance (see Appendix E).
3. The revised criteria would apply to all new and existing cash flow CDOs backed by diversified pools of corporate debt (loans and bonds) and synthetic CDOs that reference diversified pools of corporate obligations. It also applies to CDO transactions that are backed by corporate assets consisting of a mix of cash and synthetic instruments. Additionally, it is relevant for synthetic CDOs of corporate CDOs, and CDOs backed by sovereign securities. For ease of reference, we refer to these transactions as "corporate CDOs." These proposed criteria may also be used to analyze other debt instruments, whose credit risk is primarily driven by diversified pools of corporate exposures. For concentrated pools, we may apply alternative rating methods such as weak-link.
4. These proposed criteria do not cover CDOs of structured finance securities, cash flow CDOs of corporate CDOs, CDOs of mixed pools of corporate and structured finance securities that have very small concentrations of corporate debt, CDOs of municipal or public sector debt, CDOs of project finance, market value CDOs, and structured counterparties (derivative product companies). These criteria would also not apply to the analysis of transactions backed primarily by corporate debt

secured by real estate, which we would typically analyze using our criteria for rating commercial mortgage-backed securities.

Key Publication Information

- Original publication date: April 10, 2019
- Response deadline: May 13, 2019
- Effective date: Immediately upon publication of final criteria.
- Impact on outstanding ratings: See the Impact On Outstanding Ratings section.
- These criteria address the fundamentals set out in "Principles Of Credit Ratings," published on Feb. 16, 2011.

5. Where particular transactions feature novel or unusual characteristics, e.g., concentrated or "barbelled" (with two distinct concentrations) asset pools, we may apply these criteria as a starting point for our analysis and would likely make specific modifications or apply additional stresses according to our assessment of the structure and the associated credit risks.
6. Our primary focus is not on any individual input assumption or stress test, but rather on the combination of assumptions and stresses that, in our opinion, would generate an appropriate targeted level of credit protection against future defaults commensurate with our rating definitions.
7. We analyze the credit risk of corporate CDOs using a stochastic methodology by considering target portfolio default rates, which reflect the level of defaults we believe a given portfolio of corporate credits would suffer in various rating scenarios consistent with our rating definitions. These targets are informed by historical data. Key drivers of these scenario default rates (SDRs) are the asset default rate as a function of credit quality and tenor, and the pairwise asset correlation, which reflects industry and geographic concentration.
8. While we are not proposing to change this overall framework, we are proposing changes to specific areas of our analysis. The key changes we are proposing are summarized below:

   - Revise the composition of the pools that we associate with the target portfolio default rates. Currently, our target SDRs are associated with pools of highly diversified obligors in the largest number of industries under our 2009 published CDO criteria. We are proposing instead to associate our target SDRs with archetypical pools that reflect the degree of diversity of the average portfolios we have seen in the past decade, which have higher concentration than the pools we use currently. For these new archetypical pools to be associated with existing portfolio target default rates, we would modestly reduce the asset default rates, and adjust the cut-off points or rating quantiles. Decreasing the archetypical pool's obligor and industry count increases portfolio concentration and SDRs, requiring a lower level of stress to achieve the targets. That is one of the reasons for reducing asset default rates. This change would result in a reduction of approximately 2% to SDRs of existing collateralized loan obligation (CLO) portfolios, across the rating scale.
   - Update 'BBB' target default rates to reflect additional global historical data.
   - Adjust our assumptions regarding the tenor of the exposure to the assets, for transactions in which the manager commits to maintain or improve the consistency of the portfolio's credit

quality with the notes' original rating as a condition to reinvestment, for example by using S&P Global Ratings' CDO Monitor tool. In this case, in both our credit and the cash flow analysis, we generally propose to base our analysis on the assets' actual maturities, as opposed to simulating potentially longer tenors to reflect the expected effect of reinvestment. This is because such tests incorporate the effect on the transaction's credit risk of extending asset exposure through reinvestment.

- Update the asset amortization profile we use in our cash flow analysis of CLO transactions to reflect typical CLO portfolios we have seen. This is because portfolios are typically not fully invested at closing and the portfolio's maturity profile could change over time due to the reinvestment process.
- Update our assumptions for default timing and patterns, taking into account the assets' characteristics in our cash flow analysis, consistently with our global cash flow criteria. For pools of leveraged loans from issuers typically rated in the 'BB' to 'CCC' range, for example, we assume defaults are more likely to occur in the early years of the transaction, while scenarios in which no defaults occur for the first few years of the transaction are less relevant given the assets' risk profile.
- Differentiate our analysis of foreign exchange exposure in CDOs based on the transaction's potential sensitivity to this risk. This is to reflect the various characteristics we have observed across transactions historically.
- Remove the percentile approach to breakeven default rates (BDRs) in our cash flow analysis, given our proposed focus on a smaller number of the most relevant cash flow runs, and consider the minimum BDR for comparison with the portfolio's SDR.

9. We are not proposing material changes to the determination of the rating inputs, industry classifications, supplemental tests, or the recovery assumptions.

IMPACT ON OUTSTANDING RATINGS

10. These proposed criteria would apply to approximately 3,844 ratings across approximately 680 transactions. We have analyzed the expected impact on outstanding ratings, based on the exposure information for a representative sample of transactions globally. The sample included approximately 2,400 tranches across more than 400 transactions, with a portfolio weighted-average life of four to seven years. Most of the transactions tested were still within their reinvestment period.

11. Based on the proposed changes, we expect the impact on transactions in general to be marginally positive. We expect the proposed criteria to have a positive rating impact of up to two notches, affecting less than 2% of the rated universe, mainly affecting transactions post reinvestment period. We anticipate that the number of rating downgrades on speculative-grade tranches past the reinvestment period will be minimal. These downgrades will typically be of one notch and arise because we are introducing a minimum BDR and lowering the benefit of excess spread due to shorter modeled portfolio weighted-average lives.

12. We do not expect to upgrade any transactions if their reinvestment period has not ended, as the collateral manager for these transactions would typically have time to reinvest and change the credit risk profile of the transaction. However, we expect the average cushion, which is the difference between a note's BDR and the SDR for its current rating level, to increase by approximately 4%.

POTENTIAL CHANGES TO AFFILIATED CRITERIA

13. Our existing corporate CDO criteria provide a methodological framework for analyzing structured finance CDOs of corporate debt. Separate and apart from these criteria, there are a number of existing distinct criteria articles published by S&P Global Ratings for other areas of structured finance and other analytical practices beyond structured finance that currently incorporate elements of our existing corporate CDO criteria as part of their rating methodology ("affiliated criteria").

14. A non-exhaustive list of affiliated criteria include the following:

- U.S. Structured Settlement Securitizations: Methodology And Assumptions, July 11, 2016
- Methodology And Assumptions For Rating North American Single-Tenant Real Estate Triple-Net Lease-Backed Securitizations, March 31, 2016
- Covered Bond Ratings Framework: Methodology And Assumptions, June 30, 2015
- Global Container Lease-Backed ABS Methodology And Assumptions, June 5, 2015
- Methodology And Assumptions For Assessing Portfolios Of International Public Sector And Other Debt Obligations Backing Covered Bonds And Structured Finance Securities, Dec. 9, 2014
- Mapping A Third Party's Internal Credit Scoring System To Standard & Poor's Global Rating Scale, May 8, 2014
- Methodology And Assumptions For U.S. Small Business Loan-Backed Securitizations, March 28, 2014
- CDOs Of Project Finance Debt: Global Methodology And Assumptions, March 19, 2014
- Global Rating Methodology For Credit-Tenant Lease Transactions, July 22, 2013
- Derivative Product Companies Rating Methodology And Assumptions, March 22, 2013
- European SME CLO Methodology And Assumptions, Jan. 10, 2013
- CDOs And Pooled TOBs Backed By U.S. Municipal Debt; Methodology And Assumptions, April 3, 2012
- U.S. Public Finance Long-Term Municipal Pools: Methodology And Assumptions, March 19, 2012
- Global CDOs Of Pooled Structured Finance Assets: Methodology And Assumptions, Feb. 21, 2012
- Revised Cash Flow Assumptions And Stresses For Global Aircraft And Aircraft Engine Lease Securitizations, Aug. 26, 2010
- Global Methodology And Assumptions For Rating Retranchings Of Corporate Cash Flow CDOs, Oct. 15, 2009
- Methodology And Assumptions For Rating Brazilian Trade Receivables Securitizations, May 13, 2009
- New Rating Criteria for Multiple-Credit-Dependent Obligations, May 21, 2001

15. Typically, these affiliated criteria may refer to the corporate CDO criteria and/or they may incorporate elements of the existing corporate CDO criteria, such as the SDR or some of its drivers, all or part of the cash flow analysis, the supplemental tests, and/or the recovery rate

assumptions.

16. The purpose of this RFC is to propose certain changes to our corporate CDO criteria. During the RFC period, we will be identifying affiliated criteria and determining whether to extend any of the proposed changes from the corporate CDO criteria to these other criteria. Where we determine that we will make changes to any affiliated criteria, we will assess whether we view the implementation of any such changes to constitute a material change to these criteria. This assessment will be dependent in part on the nature of changes, if any, to the proposed corporate CDO criteria that may flow from the RFC process.

17. When we publish the finalized corporate CDO criteria following the completion of the RFC process, we will identify which of the affiliated criteria will also be adopting any changes consistent with the corporate CDO criteria and will indicate whether the adoption of changes constitutes a material change to those criteria, in our view. Where we determine the impact of changes to any affiliated criteria to be material, we would anticipate publishing a separate RFC on those criteria.

QUESTIONS

18. S&P Global Ratings is seeking responses to the following questions, in addition to any other general comments on the proposed criteria:

- What is your view on the changes we are proposing to our credit risk analysis of corporate pools (scenario default rates)?
- Do you have any comments on our proposed application of our global cash flow criteria, as described in Appendix E?
- Are there any other factors you believe we should consider in our analysis of corporate CDOs?

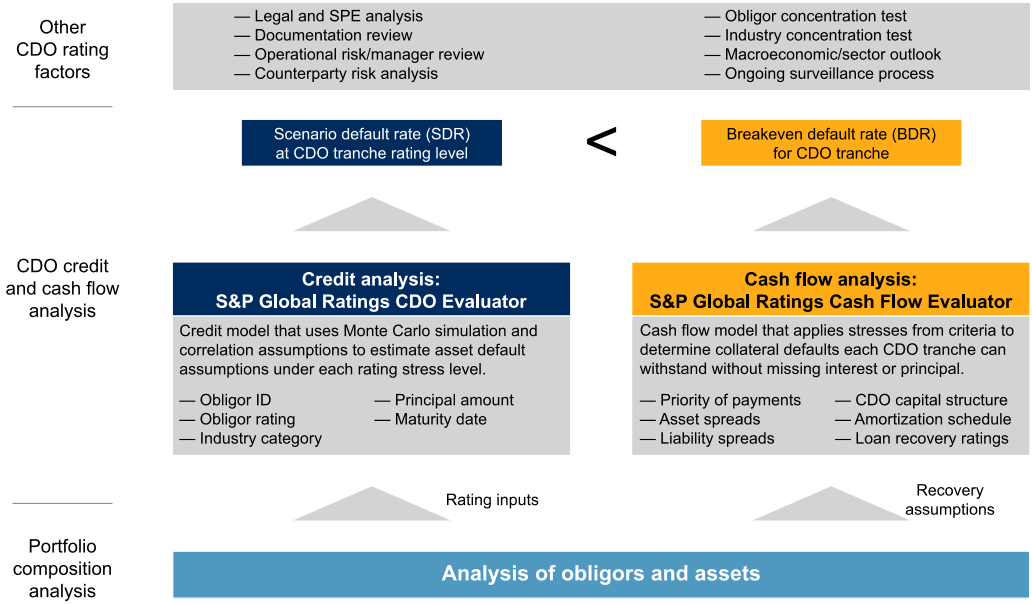
RESPONSE DEADLINE

19. We encourage interested market participants to submit their written comments on the proposed criteria by May 13, 2019, to http://www.standardandpoors.com/en_US/web/guest/ratings/rfc where participants must choose from the list of available Requests for Comment links to launch the upload process (you may need to log in or register first). We will review and take such comments into consideration before publishing our definitive criteria once the comment period is over. S&P Global Ratings, in concurrence with regulatory standards, will receive and post comments made during the comment period to www.standardandpoors.com/en_US/web/guest/ratings/ratings-criteria/-/articles/criteria/requests-for-comment/filter/all#rfc . Comments may also be sent to CriteriaComments@spglobal.com should participants encounter technical difficulties. All comments must be published but those providing comments may choose to have their remarks published anonymously or they may identify themselves. Generally, we publish comments in their entirety, except when the full text, in our view, would be unsuitable for reasons of tone or substance.

PROPOSED METHODOLOGY

Chart 1

S&P Global Ratings' CDO Analysis



20. These proposed criteria focus on our analysis of the credit risk and cash flows of CDO transactions.

21. To analyze the credit risk of a diversified portfolio of corporate exposures, we consider the asset's balance and maturity and its issuer's creditworthiness, industry, and country of origin. Where we believe the credit risk of certain assets may be driven by other factors--for example, by the default risk of a third party, as with participations--we would look for additional mitigants to these risks. Using a stochastic modeling approach, we assess the portfolio's SDR, which corresponds to our view on the level of defaults that is likely to affect the portfolio in a given rating stress scenario.

22. As a second step, we analyze the transaction's cash flows and payment profile. To achieve this, we review a transaction's structural characteristics and level of enhancement, together with covenants, including those relating to the spread in the portfolio and recovery rates. We test various scenarios, based on key rating drivers, such as default timing and patterns, to determine the maximum level of defaults that a transaction may sustain while still repaying noteholders in full and on time. This is the break-even default rate (BDR).

23. We then compare the BDR with the portfolio's SDR for the various stress scenarios. In order to assign a rating at a given level, we look for the SDR commensurate with that rating to be at or lower than the BDR.

24. We also run additional quantitative and qualitative tests, the supplemental tests, which assess the effect of concentrations and subordination levels on the notes' creditworthiness, and address both event risk and model risk that may be present in the transaction. We believe these tests, used in conjunction with the stochastic default modeling, provide a more robust analysis than using only simulation models.

25. In considering a proposed rating for a particular tranche, we look to see whether it passes (i) the standard CDO Evaluator tests, and, if applicable, (ii) the cash flow stresses and additional qualitative considerations, and (iii) all applicable supplemental tests commensurate with that

rating level. Any of these three analyses may constrain our rating on the tranche.

26. We may also consider qualitative factors when assigning ratings to CDO tranches in addition to the supplemental tests, the CDO Evaluator simulation results, and the associated cash flow modeling. These qualitative factors, and any additional risks as well as risk mitigants, may be considered on a transaction-by-transaction basis. Examples of qualitative factors that we may incorporate in our analysis, include:

- Applying cushions above the SDR (or scenario loss rate, as the case may be) generated by CDO Evaluator based on the transaction's risk profile;
- Taking a forward-looking view of the credit quality of the portfolio, for instance by considering the likelihood that changes to the portfolio composition or the credit profile of the underlying assets may affect the portfolio's credit quality in the near future; and
- Making adjustments to our modeling assumptions for the portfolio's weighted-average spread, recoveries, or other portfolio parameters depending on various factors such as the collateral manager's ability to make trades that may lower these metrics.

27. Finally, we may modify some of the modeling assumptions or apply stresses for portfolios that show heightened sensitivity to certain assumptions and/or run additional stresses for portfolios that are skewed or barbelled. For example, we may bias defaults toward a particular subset of the pool or test slightly higher or lower recovery or correlation assumptions.

Credit Analysis And CDO Evaluator Calibration

Background

28. CDO Evaluator is a model we use to quantify/simulate default rates for portfolios under different levels of stress consistent with different rating levels. The model generates a probability distribution of potential default rates for the given portfolio of assets in aggregate. The model derives a set of SDRs. We use this set of SDRs to determine, for each credit rating level, the gross level of asset defaults that we generally expect a CDO tranche with that rating to be able to withstand, according to our rating criteria.

29. Our credit analysis is calibrated to specific targeted stressed default scenarios at each of our rating categories, consistent with our rating definitions. The key parameters we consider relevant in assessing a portfolio's default rate are the asset default rates, pairwise asset correlation, and rating quantiles. The parameters are calibrated to achieve certain target default levels for 'AAA' rated CDO tranches that reflect conditions that we consider to be of extreme stress, such as during the Great Depression. We believe 'AAA' rated corporate CDO tranches should be able to withstand extreme macroeconomic stress without defaulting. Additionally, the parameters are calibrated such that 'BBB' rated CDO tranches can withstand a moderate stress that is informed by the post-1981 maximum observed corporate default rates.

30. These target portfolio default rates informed by the post-1981 maximum observed corporate default rates are shown in table 1.

Table 1

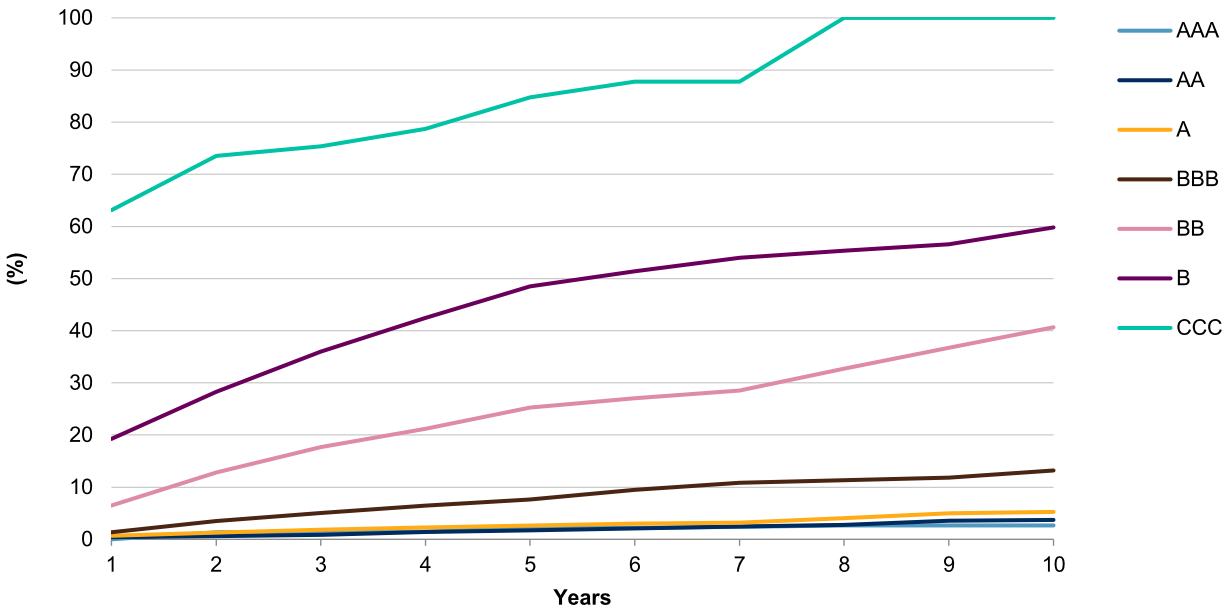
Post-1981 Maximum Observed Corporate Default Rates (%)*

	CreditPro asset pool ratings						
Year	AAA	AA	A	BBB	BB	B	CCC
1	0.0	0.4	0.7	1.4	6.5	19.3	63.1
2	1.4	0.6	1.3	3.5	12.8	28.3	73.5
3	1.4	0.8	1.8	5.0	17.7	36.0	75.4
4	1.5	1.4	2.3	6.4	21.2	42.5	78.7
5	2.2	1.7	2.7	7.7	25.3	48.5	84.7
6	2.2	2.1	3.0	9.5	27.1	51.4	87.8
7	2.4	2.5	3.2	10.8	28.5	54.0	87.8
8	2.7	2.8	4.1	11.3	32.7	55.3	100.0
9	2.7	3.5	5.0	11.8	36.7	56.6	100.0
10	2.7	3.7	5.3	13.2	40.7	59.8	100.0

*From S&P Global Ratings' CreditPro database. We note that in chart 2, some of the historical default rates do not exhibit a monotonic behavior. The maximum observed default rate in table 1 was derived across all cohorts irrespective of their starting date. As such, this is a conservative assumption because, the default rates in the table may reflect different periods. Additionally, the multiyear default rates were computed from marginal one-year default rates.

Chart 2

Post-1981 Maximum Observed Corporate Default Rates From S&P Global Ratings' CreditPro Database



31.

We expect the CDO tranches to withstand considerably higher levels of defaults in a 'AAA' scenario. For an extreme level of stress, the target portfolio default rates that 'AAA' rated CDO tranches should withstand are informed by periods of extreme stress, such as during the Great Depression.

32. Table 2 shows our targeted default rates for corporate assets for 'AAA' rated CDO tranches.

Table 2

Targeted Portfolio Default Rates For 'AAA' Rated CDO Tranches (%)*

	Asset ratings						
Weighted-average life of assets (years)	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	0.1	1.0	3.0	5.0	20.0	30.0	65.0
2	0.5	2.0	5.0	9.0	27.0	45.0	80.0
3	1.0	3.0	7.0	13.0	35.0	60.0	90.0
4	1.5	4.0	9.0	17.0	39.0	64.0	90.0
5	2.0	5.0	11.0	20.0	43.0	68.0	90.0
6	2.5	6.0	13.0	23.0	47.0	71.0	90.0
7	3.0	7.0	15.0	26.0	51.0	74.0	90.0
8	3.5	8.0	17.0	29.0	54.0	76.0	90.0
9	4.0	9.0	19.0	31.0	57.0	78.0	90.0
10	4.5	10.0	20.0	33.0	60.0	80.0	90.0

*The value in each cell reflects the targeted default rate for rating a 'AAA' CDO tranche for an archetypical portfolio of assets with the same maturity and rating. For example, we require a 'AAA' CDO tranche of an archetypical portfolio consisting of 5-year assets rated 'B' to withstand a 68% portfolio default rate. There are important relationships among all the cells in the table: The value in each cell is greater than the value in the cell above, lower than the value in the cell below, greater than the value in the cell to the left, and lower than the value in the cell to the right.

33. Appendix A provides more insight into our derivation of the targeted portfolio default rates for 'AAA' rated CDO tranches.

34. We use the targeted portfolio default rates that 'AAA' rated CDO tranches should be able to withstand to create modeling parameters for the CDO Evaluator simulation model (see table 2). Those parameters include (i) asset default rates for pool assets, (ii) correlation factors to address the interdependency of defaults of separate credits within an asset pool, and (iii) rating quantile points to relate defaults to CDO tranche ratings.

Asset default rates

35. The modeling parameters for asset default rates are shown in table 3. Appendix B presents the full 30-year asset default table for all the ratings without ratings modifiers.

36. We produce starting values for table 3 based on a methodology similar to the one we use to produce our annual default studies. The values are further adjusted to create an idealized term structure of asset default rates such that the portfolio default rates approach the targets in tables 1 and 2.

Table 3

Asset Default Rate Inputs For CDO Evaluator Simulation Model (%)

	Rating						
Tenor (years)	AAA	AA	A	BBB	BB	B	CCC
1	0.003	0.016	0.179	0.415	1.899	7.063	18.445
2	0.014	0.066	0.407	0.983	4.185	13.357	31.488
3	0.037	0.155	0.694	1.708	6.751	18.998	40.816
4	0.076	0.286	1.044	2.588	9.496	24.057	47.693
5	0.135	0.464	1.463	3.612	12.336	28.595	52.930
6	0.217	0.690	1.954	4.764	15.206	32.671	57.043
7	0.326	0.967	2.516	6.027	18.055	36.340	60.365
8	0.465	1.298	3.150	7.383	20.847	39.652	63.114
9	0.638	1.684	3.855	8.815	23.558	42.652	65.438
10	0.846	2.125	4.627	10.306	26.171	45.381	67.440

Note: The above percentages are rounded to three decimal places.

37. We assume that rating transitions generally follow a homogeneous Markov process. In this framework, we derive the cumulative transition probabilities by raising the one-year transition matrix to iterative powers. We adjusted the one-year transition matrix further to ensure monotonicity across rating levels to obtain proper and coherent behavior of the transition probabilities as a function of the 19 refined rating categories. We further adjusted it to better fit observed empirical cumulative default rates.

Correlation

38. Correlation parameters are key assumptions in portfolio default simulation models. For the limited purposes of using CDO Evaluator, we make certain assumptions about correlation, including the assumption that correlation is likely to remain constant over time, as well as being uniform across many industries within our classification system. While these assumptions are, by their nature, qualitative, we believe that they are reasonable for reducing the complexity of the modeling process and enhancing its transparency.

39. The correlation parameters under these proposed criteria are 0.20 for two firms in the same corporate industry and 0.075 for two firms in different corporate industries. In addition, the criteria provide for correlation of 0.05 between assets from different industries in different geographic regions. Correlation parameters fatten the tails of the simulated default distribution and move the expected level of defaults closer to the aforementioned CDO Evaluator default targets. Appendix C shows the correlation assumptions by asset type.

Ratings quantiles and results calibration

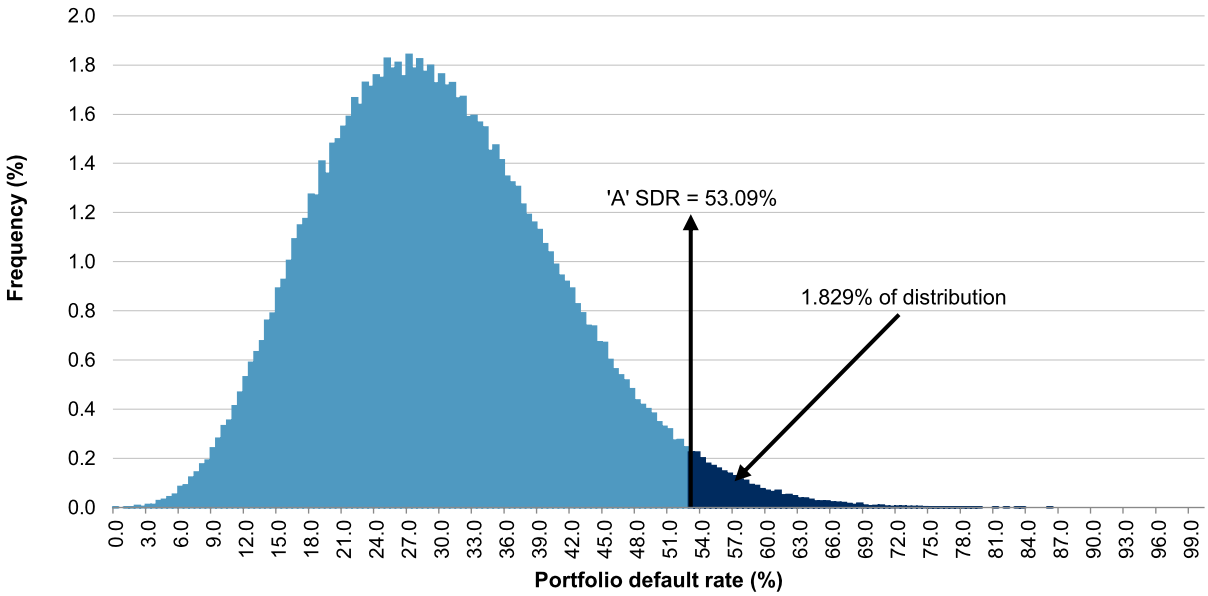
40. The model uses rating quantiles (cut-off points) associated with each rating level so that the simulated level of asset defaults can be related to a CDO tranche rating.

41. CDO Evaluator first runs a Monte Carlo simulation of defaults, which produces a simulated distribution of asset defaults as shown in chart 3. This distribution, however, does not automatically relate to the specific creditworthiness of a CDO tranche. To do this, one must relate

portfolio defaults to CDO tranche ratings.

Chart 3

Simulated Distribution Of Portfolio Defaults



42. To achieve this, the criteria adjust the rating quantiles so that the model reflects the targeted benchmarks given in table 2. In other words, we set the rating quantiles for 'AAA' rated tranches at a level where the tranches can withstand the gross asset simulated defaults specified in table 2. Accordingly, the rating quantiles are a principal device for calibrating the CDO Evaluator model.

43. As chart 3 shows, given a rating quantile of 1.829% we identify the level of gross defaults (SDRs), 53.09% in this example, such that the modeled probability of having defaults exceed that level of gross defaults is 1.829%. Appendix D presents the rating quantiles table.

CDO Evaluator output: Calibration results

44. To calibrate CDO Evaluator to the targeted portfolio default rates in table 2, we use archetypical portfolios of corporate credits. We ran these pools of assets using the CDO Evaluator assumptions--as given in this section--to produce the projected SDRs shown in table 7 for 'AAA' rated corporate CDO liabilities (see Appendix A).

45. For the calibration, the pools were composed of 105 homogeneous obligors equally weighted in 23 industry categories. All the assets had the same credit rating (without plus or minus ratings qualifiers). The composition of the pools was informed by analyzing the average and median of the effective number of obligors and industries in the underlying portfolios securitized in the past decade. The effective number of obligors and industries was computed using the Herfindahl index. In this way, our analysis incorporates the varying sizes of obligors and industries.

46. This archetypical pool is distributed across a smaller number of industries and fewer obligors than the theoretical pool we use in our current methodology, which was constructed to reflect a very high degree of diversity. As a result, under our proposed approach, CDO portfolios that have a higher number of effective obligors and industries than the archetype would have lower SDRs than our targets, while portfolios that have a smaller number of effective obligors and industries would have higher SDRs than our targets.

Asset Recovery Assumptions

47. Our recovery rate assumptions are a function of the information available to us. Specifically, we propose to use different recovery rates, depending on whether a relevant recovery rating is available or not. In forming an opinion, we consider relevant available historical recovery data from recession periods and how those relate to our ratings definitions, to inform our forward-looking view of recovery assumptions at various stress levels.

48. Our recovery methodology tiers recoveries, based on the rating scenario considered for the CDO tranche. This reflects empirical evidence that recovery rates are inversely related to default rates. For both cash flow CDOs and synthetic CDOs, our recovery assumptions reflect a downward adjustment in expected recoveries under more-stressful scenarios that senior rated tranches of CDOs should withstand. The lower recoveries are in line with the expectations for the credit cycle, where higher defaults and a lack of liquidity will likely increase the number of businesses that liquidate rather than restructure, thus putting a stress on recoveries.

Recoveries based on recovery ratings

49. When a recovery rating is available for the asset in the portfolio, we propose to use recovery rate assumptions that are informed by that recovery rating and its related point estimate, if any. Where a recovery rating is available for an asset that is senior to the one in the portfolio, we would also use this information to determine our recovery assumption for the asset in the pool.

Recoveries based on asset type

50. If the asset does not have a recovery rating and no more-senior-ranking asset carries a recovery rating, we propose to use an analytical framework that differentiates corporate recoveries based on asset type (loans vs. bonds), on the priority/seniority of the asset (senior secured, senior unsecured, subordinated) in an insolvency of the company and its country grouping.

51. For different asset types' recoveries, we generally propose to group different countries based on our analysis of their insolvency legal frameworks. We believe this framework is a good indication of the varying rights creditors have to secure their claims and realize a recovery.

52. For more information regarding each group's insolvency framework, please see "Methodology: Jurisdiction Ranking Assessments," published Jan. 20, 2016. For countries that do not have a jurisdictional ranking assessment the proposed criteria assume recoveries in the lowest ranking group.

53. In addition, for our analysis of synthetic CDOs, our recovery framework considers both a mean recovery rate and a standard deviation to achieve appropriate rating differentiation.

54. Our detailed recovery assumptions by rating level are presented in Appendix E.

Cash Flow Modeling

55. A cash flow analysis and the associated cash flow stresses are key components of our approach for rating CDO securities as well as combination notes that may be issued as part of a CDO transaction. For this purpose, we propose to apply our global cash flow criteria alongside these criteria.

56. The key variables we consider as part of our analysis of CDOs are:

- The portfolio amortization profile;
- Default patterns and timing;
- Recovery levels and timing;
- Interest rate stresses;
- Foreign exchange risk stresses, where relevant;
- Management fees;
- Small interest shortfalls and payment timing mismatch; and
- Deferrable obligations.

57. Generally, our analysis of combination notes uses the same approach as for the underlying components, as described in these criteria. However, when our analysis of combination notes partly relies on cash flows to an equity note, we also consider additional risk factors that may affect the distribution of payments to these notes. These would depend on a transaction's structure and payment waterfall but may include, for example, uncapped junior expenses, subordinated termination payments, and the higher sensitivity of equity cash flows to the availability of excess spread in the transaction.

58. While the adoption of the global cash flow criteria for rating CDO securities does not itself constitute a change to what we consider are the key risk drivers, we are proposing to introduce certain changes to specific areas of our cash flow analysis for CDO transactions.

59. Our detailed assumptions for assessing the cash flows of corporate CDO transactions would be set out in a related guidance article, which is appended to this Request for Comment (see Appendix E).

Foreign exchange risk analysis

60. Where a CDO transaction is exposed to foreign exchange currency risk, we reflect this in our cash flow analysis. We typically do this by biasing defaults toward each currency bucket and testing the devaluation of each currency against the other. Our forward-looking analysis would take into account the characteristics of the transaction and any potential partial hedging strategy that may be in place for all or part of the transaction's life. Where we consider the exposure is minimal, we may look to contractual mitigants as an alternative to cash flow modeling.

61. To determine the magnitude of the bias, we assess the potential sensitivity of a transaction to foreign exchange risk. We consider factors such as the magnitude of the currency exposure, the effectiveness of coverage tests in addressing this additional risk, and the manager's reinvestment strategy, as per the reinvestment guidelines, and specifically the extent to which we believe it has the potential to expand or the commitment to contain the transaction's exposure to unhedged foreign exchange risk.

62. In combination with the biased defaults, we run currency devaluation factors in accordance with our foreign exchange stress criteria (see "Foreign Exchange Risk In Structured Finance – Methodology And Assumptions," published April 21, 2017).

Break-even result analysis for cash flow CDOs

63. Under our criteria, a key part of the cash flow analysis is the consideration of a tranche's minimum BDR. This is a measure of the maximum level of gross defaults that a tranche can withstand and still fully repay the noteholders, given the transaction structure, asset characteristics, payment mechanics, and proposed credit enhancement. To analyze a tranche, we run a number of cash flow scenarios that incorporate different key variables.

64. In order to assign a tranche a given rating, we generally expect that tranche's minimum BDR to be equal to or higher than the SDR, considering stresses commensurate with that rating level.

Supplemental Stress Tests

65. The criteria include supplemental tests intended to address both event risk and model risk that may be present in rated transactions. These supplemental tests are the largest obligor default test and the largest industry default test.

Applicability of the supplemental tests

66. Typically, we run all applicable tests when assessing the rating on a CDO tranche. For example, in considering a proposed 'AAA' rating, we assess whether the CDO tranche has sufficient credit enhancement to pass the supplemental tests and meet the standards associated with CDO Evaluator and the relevant cash flow stresses.

67. Exceptional circumstances may warrant an adjustment of these supplemental tests. For example, it is possible that small CDO tranche balances or short exposure periods may call for adjustments to the supplemental tests. For these tests, we use the same obligor ratings that we use in CDO Evaluator. We may also reassess the suitability of certain supplemental tests depending on the pool composition and may use an alternative supplemental test that better addresses a transaction's specific risk profile.

68. For transactions that employ excess spread, we may apply this test by running our cash flow model using the forward interest rate curve, including the highest of the losses from the largest obligor default test and/or industry default test net of their respective recoveries. We deem the test to have passed if cash flows show that the tranche that is subject to the test receives timely interest (or full interest, if the tranche is deferrable) and ultimate principal payments.

69. Because this test specifically attempts to capture event risk not addressed by the Monte Carlo default simulation in CDO Evaluator, we have deliberately included defaults of obligors rated higher than the rating on a CDO tranche and use a low flat recovery rate assumption. The larger the numbers of obligors, the more likely it is that defaults of highly rated obligors may occur.

Largest obligor default test

70. This test assesses whether a CDO tranche has sufficient credit enhancement to withstand specified combinations of underlying obligor defaults based on the ratings on the underlying obligors, with a flat recovery rate assumption that generally reflects the potential for very low recoveries, as observed under stressful conditions.

Table 4

Largest Obligor Default Test

Event risk test: Survive a number of defaults with a flat recovery rate assumption

	CDO liability rating*						
Obligor rating	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
'AAA' to 'CCC-'	2	1	-	-	-	-	-
'AA+' to 'CCC-'	3	2	1	-	-	-	-
'A+' to 'CCC-'	4	3	2	1	-	-	-
'BBB+' to 'CCC-'	6	4	3	2	1	-	-
'BB+' to 'CCC-'	8	6	4	3	2	1	-
'B+' to 'CCC-'	10	8	6	4	3	2	1
'CCC+' to 'CCC-'	12	10	8	6	4	3	2

*In all tables used throughout this article, unless otherwise noted, CDO tranche or liability rating categories below 'AAA' include rating subcategories, e.g., the 'AA' column also applies to CDO tranches rated 'AA+' and 'AA-'.

Largest industry default test

71. This test consists of two parts: the "primary largest industry default test" and the "alternative largest industry default test." Together, they assess whether a CDO tranche rated 'AAA', 'AA+', 'AA', or 'AA-' has sufficient credit enhancement to withstand the default of all obligors in the transaction's largest industry, with a flat recovery rate, or otherwise meet an alternative largest industry default test. Either of the tests may be a limiting factor for our rating on a CDO tranche. The largest industry default test does not apply to sovereign assets.

72. Corporate CDO tranches rated 'AAA' or 'AA' should be able to withstand the default of all obligors in the largest single industry in the asset pool with a flat recovery rate. For this test we use the same industry classification as used in CDO Evaluator.

73. The flat recovery rate assumption is the same recovery we assign to senior secured debt from Group C countries (see the "Recoveries based on asset type" section). This test applies a higher recovery assumption than the largest obligor default test because recoveries across a whole industry imply an averaging effect. Therefore, industrywide recoveries are necessarily higher than the lowest recovery within the group.

74. Although defaults of all companies in a given industry would be extremely unlikely, that is not relevant for the test in CDOs. It is important to highlight that actual CDO transactions do not have exposures to all the companies from any given industry, but rather just to a more concentrated subset of companies from each industry. Thus, it is within the realm of possibility that when an industry experiences stress, all the members of that industry represented in a given CDO may face higher stresses.

75. The mechanics of this analysis are the same as for the largest obligor default test. We consider whether there are sufficient assets remaining to support the rated tranches once we apply the largest industry default test and recoveries from this test.

76. However, we may still assign a rating of 'AAA' or 'AA' to a tranche even though it fails the primary largest industry test, if it passes the following alternative largest industry default test. A 'AAA' rated tranche should have sufficient credit enhancement to survive the highest level of losses associated with the defaults of each of the following combinations of underlying obligors within

each industry, assuming the same flat recovery rate as under the largest obligor default test:

- The four largest obligors rated between 'AAA' and 'CCC-';
- The six largest obligors rated between 'AA+' and 'CCC-';
- The eight largest obligors rated between 'A+' and 'CCC-';
- The 12 largest obligors rated between 'BBB+' and 'CCC-';
- The 16 largest obligors rated between 'BB+' and 'CCC-';
- The 20 largest obligors rated between 'B+' and 'CCC-'; and
- The 24 largest obligors rated between 'CCC+' and 'CCC-'.

77. A 'AA' rated tranche should have sufficient credit enhancement to survive the highest level of losses associated with the defaults of each of the following combinations of underlying obligors within each industry, assuming the same flat recovery rate as under the largest obligor default test:

- The two largest obligors rated between 'AAA' and 'CCC-';
- The four largest obligors rated between 'AA+' and 'CCC-';
- The six largest obligors rated between 'A+' and 'CCC-';
- The eight largest obligors rated between 'BBB+' and 'CCC-';
- The 12 largest obligors rated between 'BB+' and 'CCC-';
- The 16 largest obligors rated between 'B+' and 'CCC-'; and
- The 20 largest obligors rated between 'CCC+' and 'CCC-'.

78. The alternative industry test is an adaptation of the largest obligor default test. It is intended to capture gradations of obligor credit quality while applying somewhat higher default intensity than the largest obligor test.

Additional Rating Considerations

79. We consider the transaction's structural features and documentation and, to the extent possible, we seek to reflect those in our analysis of cash flows. Among the transaction characteristics that are key to our cash flow analysis are the par amount of collateral, credit enhancement, and coverage tests. We also believe that certain collateral characteristics are key to mitigating the risks to the transaction's ability to pay the rated debt (see Appendix F). Therefore, as part of our analysis, we pay particular attention to features that have the potential to deteriorate par coverage and credit enhancement, such as:

- The allocation of proceeds from the assets as principal or interest proceeds, such as trading gains, the treatment of certain principal funds as interest proceeds, or conditions for using funds to exercise warrants, and how this may affect our view of the collateralization levels;
- The covenants and parameters driving reinvestment, such as conditions for the reinvestment of sale or payment proceeds during and after the reinvestment period; coverage tests and portfolio credit quality maintenance; and rules governing trading plans, and the extent to which they enable preservation of collateral principal or contain risk factors that may erode credit enhancement; and

- The way coverage tests are calculated and the way in which assets with specific risk factors are taken into account therein, in particular assets which are defaulted, 'CCC' rated, current-pay, long-dated, debtor-in-possession loans and discounted or distressed exchange obligations.

Stable quality versus stressed portfolio approach

80. Most cash flow CLOs and some synthetic CDO transactions allow for reinvestments and asset trading. These transactions have asset eligibility criteria and contractual provisions that govern the type of trading allowed and the requirements for maintaining the asset portfolio within certain boundaries. Often, however, sponsors or asset managers may select a transaction's initial portfolio with characteristics that are stronger than the minimum requirements of the governing documents and make certain commitments toward maintaining a specific portfolio credit quality.

81. In particular, we may rate a CDO transaction based on the manager's documented commitment to generally maintain or improve the consistency of the proposed portfolio's credit quality with the notes' original rating as a condition of reinvesting (the "stable quality" approach), for example, using S&P Global Ratings' CDO Monitor. In this case, we would reflect this ongoing commitment by focusing our credit analysis primarily on the characteristics of the actual portfolio.

82. Alternatively, we would apply a "stressed portfolio" approach in our rating analysis, even though the initial portfolios may be stronger, where we believe the transaction documents do not include a sufficiently robust test to ensure the portfolio's credit quality is maintained or improved during reinvestment. In this approach, we would analyze the transaction according to the covenants in the transaction documents, such as asset eligibility, pool concentration, and reinvestment guidelines.

83. If sponsors and managers structure a transaction based on the hypothetical stressed portfolio approach, and we rate it on that basis, we expect the sponsor, trustee, or manager to confirm on the "effective date" that the trades and portfolio ramp-up meet the asset eligibility, quality, and reinvestment guidelines specified in the applicable transaction documents.

Debt issuance relative to asset value

84. When we analyze transactions securitizing distressed debt assets, we expect the issuance of rated CDO liabilities to be limited to what we believe to be the arm's-length purchase price of the assets, or to the amount of a third-party valuation.

85. For such transactions, we may consider the sources and uses for funds to better understand the economic benefit to all investors. If such information is not provided, or if there is more than a moderate difference between the proposed purchase price of the assets plus the money retained in the transaction relative to the proposed amount of rated debt, then we would likely cap (barring other mitigating factors) the amount of rated note issuance to the economic value retained in the transaction. This analysis factors in the payment priorities of the transaction and the manner in which interest and principal proceeds can be recharacterized.

Note redemption, amendments, refinancing, and repricing

86. We typically review provisions relating to note redemption, amendments, refinancing, and repricing to assess the likelihood that the rated notes would be repaid in full under the rating scenario considered. According to our rating definitions and our "Principles For Rating Debt Issues Based On Imputed Promises," published Dec. 19, 2014, we assess the likelihood that securities receive full principal payment by their legal final maturity date. This drives the way we analyze the

contractual terms governing CDO notes, in particular the provisions relating to the redemption, refinancing, and repricing of notes or amendments to their terms. In reviewing the documentation, we would assess whether the conditions under which these events may occur are likely to affect the full repayment of the notes or if approval of 100% of noteholders of each affected class is required otherwise (see Appendix F).

87. These considerations also apply to our analysis of combination notes. In particular:

- We also rate combination notes to the repayment of their full principal amount and would therefore withdraw our rating upon full payment of that amount. We consider that this promise to pay may also be met through the physical delivery at no cost of the combination notes' underlying components.
- Our ratings would not address a different "rated balance" than that due under the terms of these notes.
- Similar to other notes, we would review the terms and conditions leading to early redemption or refinancing to assess the likelihood that combination notes would be fully repaid.

Analysis of events of default

88. When analyzing the effect of note events of default on the rating of CDOs, we apply our general criteria "Methodology: Criteria For Global Structured Finance Transactions Subject To A Change In Payment Priorities Or Sale Of Collateral Upon A Nonmonetary EOD," published March 2, 2015.

89. In particular, these criteria would apply to our analysis of events of default that are related to the failure to meet certain overcollateralization tests (event of default overcollateralization tests; see Appendix F).

90. If, over the life of a CDO transaction, an event of default does occur, we would seek to reflect this in our rating. One of the key factors we review in this situation is the voting requirement associated with effecting an acceleration or a liquidation. If we believe an acceleration or liquidation is likely, our ratings would reflect our forward looking view of the potential risk that the various classes of notes may suffer a loss as a result of such an event, considering the characteristics of the market and transaction at that time.

APPENDIXES

APPENDIX A: CDO Evaluator Calibration

91. The criteria drive a calibration of the Monte Carlo default simulation in CDO Evaluator, which is intended to reduce the limitations associated with calibrating the model based solely on historical data. We believe that the model reflects our views of the expected defaults under different levels of stress, commensurate with our ratings definitions. Models may not fully capture real-world dynamics as they transform input variables into outputs, especially since individual CDOs contain only a subset of the obligors from the rated corporate universe. In the process of moving from inputs to outputs, a model can lose some realism because of its imperfect ability to reproduce the nuance of the real world. As such, we focused on recalibrating the CDO Evaluator model to produce output results as close as possible to our view of what the real-world results would likely be at each rating stress level.

92. The process of calibrating CDO Evaluator, starts with the table of targeted portfolio default rates

that 'AAA' rated CDO tranches should, in our opinion, be able to withstand over various time horizons, supported by underlying pools of assets of uniform credit quality and having a level of diversification commensurate with the portfolios securitized in the last decade. We built the archetypical pools based on the average effective number of obligors and industries observed in the securitized portfolios. As opposed to using the widest possible diversification for the archetypical pool, using pools with average levels of diversification to calibrate our targets, means that some of the more diversified securitized CDO pools will exhibit lower projected portfolio default rates than our targets, while more concentrated CDO pools will have higher projected portfolio default rates. The table of targeted portfolio default rates functions as the desired output of the model. As such, it also influences some level of adjustments to the model inputs beyond the historically observed parameters. By allowing us to adjust input values that produce the targeted results through the Gaussian copula framework, we reduce the dependence of our analysis on the modeled inputs. The output expresses our view of the likely outcome, regardless of the modeling framework. Before discussing the calibration, it is important to highlight that we do not ascribe "default probabilities" to each rating category. Rather, our credit ratings express a relative ranking of creditworthiness and may encompass not only relative likelihood of default but also payment priorities, recoveries, credit stability, and additional stress factors.

93. The first consideration in establishing the targeted default table was an analysis of S&P Global Ratings' CreditPro database of corporate defaults since 1981. From the CreditPro global database, we extracted the maximum observed default rates for different rating categories over varying time horizons (see table 1). We noted two distinct waves of default of 'BBB' rated corporate credits, one in the wake of the 1982 recession and one in the wake of the early 2000s tech bubble and corporate governance scandals. Generally, the 2008 recession had lower peak default rates than the aforementioned recessions. Accordingly, we concluded that for corporate credits, the worst observed performance since 1981 generally represents a 'BBB' level of stress for the purposes of our CDO criteria, meaning that, in general, we expect 'BBB' rated CDO issues to withstand this stress without defaulting.

94. This is consistent with our view of corresponding stress levels across different recessions and financial crises. Since the early 1980s, there have been the 1982 recession in the U.S., the 1989 Japanese bubble, the early 1990s U.K. recession, and the early 1990s Nordic banking crisis, each of which, in our view, is generally commensurate with a 'BBB' stress level for corporate CDOs (see "Understanding Standard & Poor's Rating Definitions" for additional details). Therefore, our targeted default table for the 'A' stress would have to reflect somewhat higher default rates, the one for the 'AA' stress would have to reflect substantially higher default rates, and the one for the 'AAA' stress would have to reflect still higher default rates than observed since 1981. While for corporate CDOs we view the worst observed corporate default levels as representing a 'BBB' stress, we note that other asset classes may have experienced different levels of stress during the same time frame.

95. Next, as additional points of reference, we considered historical studies of bond defaults from earlier periods. These studies naturally reported higher default rates during earlier times of greater stress, such as during the Great Depression and around the time of World War I. For example, Hickman (1958) reported four-year default rates for bonds rated in each of the top four rating categories (see table 5).

Table 5

Four-Year Default Rates For Corporate Bonds Rated In The Top Four Rating Categories (%)

Category	I	II	III	IV
1912-15	3.8	2.7	15.8	13.1
1916-19	0.0	1.7	1.9	9.7
1920-23	0.0	0.0	4.0	0.0
1924-27	1.7	0.0	0.0	1.8
1928-31	0.0	0.2	0.3	3.6
1932-35	0.5	0.1	8.4	10.5
1936-39	0.0	2.2	4.6	5.1
1940-43	0.0	0.0	0.0	0.7
-	-	-	-	-
1920-27	0.9	0.0	3.7	6.3
1920-31	0.0	0.1	2.6	4.7
1920-39	2.3	2.0	8.0	8.8
1924-39	2.0	2.8	4.3	4.7
1928-39	2.7	4.1	6.1	8.6
1932-39	0.2	1.4	6.8	10.6

Sources: Hickman, B.W., Corporate Bond Quality and Investor Experience, National Bureau of Economic Research, Princeton U. Press, p. 190 (1958) (http://www.nber.org/books/hick58-1). Note: From special tabulations of the National Bureau of Economic Research: par amount data for large issuers in the periodic experience sample. Default rates for other than four-year periods are reduced to quadrennial basis; e.g., one-half of the default rates from 1920-1927 was entered for that period.

Categories I through IV correspond to median agency ratings coded as follows

Category	Standard Statistics	Poor's	Moody's	Fitch
I	A1+	A**	Aaa	AAA
II	A1	A*	Aa	AA
III	A	A	A	A
IV	B1+	B**	Baa	BBB

96. Because our default studies are based on issuer counts, while Hickman's calculations are based on par amounts, there are inherent limits on how precisely one can compare the two in comparing performance over time. In addition, for much of the period that Hickman's study covers, the asset mix was quite different than in the current market, with railroad bonds comprising a large share of the subject population in the Hickman study. The concentration in railroads was a reflection of that industry's prominence in the overall national economy and not an accident of adverse selection. Nevertheless, Hickman's study provides, in our opinion, an important view of corporate credit default performance during the first half of the 20th century, and serves as one of our reference points in calibrating CDO Evaluator.

97. Hickman also compared four-year default rates of investment-grade and speculative-grade corporate bonds and, years later, Moody's reported analogous findings based on its own data (see table 6). Equipped with the post-1981 CreditPro data and studies of defaults from earlier periods to serve as reference points, we started to construct an initial table of targeted portfolio default rates that 'AAA' rated CDO tranches should, in our view, be able to withstand.

Table 6

Four-Year Default Rates: Hickman Vs. Moody's

(%)

	Investment-grade		Speculative-grade	
Year	Hickman	Moody's	Hickman	Moody's
1912-15	7.0	N/A	49.3	N/A
1916-19	3.4	N/A	21.6	N/A
1920-23	1.0	1.5	18.2	7.9
1924-27	1.1	1.9	23.5	11.6
1928-31	1.4	2.0	22.6	13.6
1932-35	6.2	11.3	48.9	33.9
1936-39	3.3	2.8	21.7	9.9
1940-43	0.4	0.6	8.9	5.4

Sources: Hickman, B.W., Corporate Bond Quality and Investor Experience, National Bureau of Economic Research, Princeton U. Press, p. 189 (1958) (http://www.nber.org/books/hick58-1); Carty, L. and Lieberman, D., Historical Default Rates of Corporate Bond Issuers, 1920-1996, Moody's research report, p. 10 (Jan 1997). N/A--Not available.

98. In constructing our targeted default table, we applied a few basic guidelines, or conditions, that are consistent with our rating framework. We required that cumulative default rates increase as a function of the time horizon because bonds that have defaulted in earlier periods continue to be counted in the default rate over longer time horizons. Also, we wanted the progression of default rates from one rating category to the next to follow a sensible progression, with meaningful differences between adjacent rating categories. The target portfolio default rates for a 'AAA' liability rating (Table 2) should be higher than the post-1981 maximum observed corporate default rates from S&P Global Ratings' CreditPro database (Table 1).

99. We preserved the approximate geometric progression across the rating categories displayed in the CreditPro data (subject, of course, to an upper limit of 100%). However, we imposed increased differentiation among the rating categories at the higher end of the rating scale. Table 2 shows the results of our targeted default rates for corporate assets for 'AAA' rated CDO tranches.

100. We also performed a research study in which we quantified the impact of economic variables on corporate bond defaults for assets rated 'BB' and 'B'. We use our framework to forecast potential default rates for assets in these rating categories conditional upon certain realizations of specific macroeconomic factors commensurate with levels of extreme stress. For our 'AAA' targets, we used scenarios for the macroeconomic variables from the Great Depression. The outcome of this study shows that there is variability around the level of default rates that might be expected under a 'AAA' level of stress. For example, when using GDP growth, Treasury yield slope, Aaa to Baa credit spreads, and S&P 500 monthly volatility for 10-year periods between 1928 and 1941, we get projected levels of default for 'B' rated assets in the range of 61%-72% for a 10-year horizon and 45%-60% for a five-year horizon. These projections should be compared with our targeted level of default in a 'AAA' scenario for 'B' rated pools over 10-year and five-year horizons of 80% and 68%, respectively.

101. Similarly, we get projected levels of default for 'BB' rated assets in the range of 46%-62% for a 10-year horizon and 31%-51% for a five-year horizon. These projections should be compared with our targeted level of default in a 'AAA' scenario for 'BB' rated pools over 10-year and five-year horizons of 60% and 43%, respectively.

102. The projections indicate that our targets are generally in line with the macroeconomic study and,

given the range of outcomes, we propose not to treat these targets as minimum SDR thresholds in our calibration. We propose to assume that they represent our targets for portfolios that are closer to the securitized pools.

CDO Evaluator calibration

103. To test our credit analysis calibration, we run our credit analysis on the archetypical pool in a 'AAA' rating scenario, using the rating inputs we are proposing: asset default rates, pairwise asset correlation, and quantiles (see table 7), in order to compare these outputs with our proposed targeted portfolio default rates that we have defined as commensurate with a 'AAA' rating scenario (see table 2).

Table 7

'AAA' Scenario Default Rates For Different Asset Pools (%)

	Asset rating						
Tenor (years)	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	1.90	2.86	7.62	8.57	21.90	41.90	70.48
3	1.90	4.76	9.52	15.24	33.33	59.05	81.90
5	3.81	5.71	11.43	20.00	43.81	66.67	87.62
7	4.76	8.57	14.29	25.71	49.52	72.38	90.48
9	5.71	10.48	17.14	30.48	56.19	77.14	91.43

104. Table 8 shows the ratio of the modeled SDR in table 7 to the corresponding targeted portfolio default rate in table 2. This shows a "coverage ratio" of model results relative to the targets.

Table 8

New 'AAA' CDO Evaluator SDR Divided By Targeted 'AAA' Output (%)

	Asset rating						
Tenor (years)	AAA	AA	A	BBB	BB	B	CCC
1	1904.76	285.71	253.97	171.43	109.52	139.68	108.42
3	190.48	158.73	136.05	117.22	95.24	98.41	91.01
5	190.48	114.29	103.90	100.00	101.88	98.04	97.35
7	158.73	122.45	95.24	98.90	97.11	97.81	100.53
9	142.86	116.40	90.23	98.31	98.58	98.90	101.59

SDR--Scenario default rate.

105. Table 8 shows that, in some cases, CDO Evaluator results diverge slightly from the targeted portfolio default rates. This is a result primarily of (i) the complexities related to optimizing a multivariate problem across different parameters, (ii) the requirement that cumulative default curves for different rating levels do not intersect (i.e., cumulative defaults regardless of tenor should always be higher as ratings decrease), and (iii) the requirement that multiyear default rates be derivable from one-year default rates.

Appendix B: Asset Default Rate Inputs For CDO Evaluator Default Simulation Model

Table 9

30-Year Corporate Defaults (%)

Tenor (years)	Asset rating						
	AAA	AA	A	BBB	BB	B	CCC
1	0.003	0.016	0.179	0.415	1.899	7.063	18.445
2	0.014	0.066	0.407	0.983	4.185	13.357	31.488
3	0.037	0.155	0.694	1.708	6.751	18.998	40.816
4	0.076	0.286	1.044	2.588	9.496	24.057	47.693
5	0.135	0.464	1.463	3.612	12.336	28.595	52.93
6	0.217	0.69	1.954	4.764	15.206	32.671	57.043
7	0.326	0.967	2.516	6.027	18.055	36.34	60.365
8	0.465	1.298	3.15	7.383	20.847	39.652	63.114
9	0.638	1.684	3.855	8.815	23.558	42.652	65.438
10	0.846	2.125	4.627	10.306	26.171	45.381	67.44
11	1.093	2.621	5.462	11.842	28.679	47.872	69.191
12	1.381	3.172	6.358	13.409	31.077	50.156	70.743
13	1.711	3.777	7.308	14.995	33.365	52.257	72.133
14	2.084	4.435	8.309	16.592	35.543	54.196	73.389
15	2.502	5.144	9.355	18.19	37.616	55.993	74.533
16	2.965	5.901	10.441	19.783	39.588	57.663	75.582
17	3.473	6.705	11.563	21.365	41.464	59.22	76.548
18	4.026	7.552	12.716	22.932	43.248	60.675	77.442
19	4.623	8.44	13.894	24.48	44.947	62.037	78.273
20	5.263	9.367	15.094	26.007	46.566	63.317	79.049
21	5.946	10.329	16.313	27.51	48.109	64.522	79.774
22	6.67	11.323	17.545	28.988	49.581	65.658	80.454
23	7.434	12.346	18.789	30.439	50.987	66.731	81.094
24	8.235	13.396	20.04	31.862	52.331	67.747	81.698
25	9.072	14.469	21.296	33.258	53.618	68.711	82.268
26	9.943	15.563	22.554	34.626	54.85	69.626	82.807
27	10.847	16.675	23.811	35.966	56.031	70.497	83.319
28	11.779	17.803	25.067	37.277	57.165	71.327	83.805
29	12.739	18.943	26.318	38.561	58.254	72.118	84.267
30	13.725	20.094	27.564	39.818	59.301	72.874	84.707

Appendix C: Correlation Assumptions For CDO Evaluator Default Simulation Model

Table 10

Correlation Assumptions

Correlation between assets with the same asset type

	Corp (local)	Corp (regional)	Corp (global)	SF (excluding CDO)	CDO	Project finance	IPF	Muni	Sovereign
Assets in the same country	0.200	0.200	0.200	0.700	0.700	0.200	0.150	0.150	1.000
Assets in the same region	0.200	0.200	0.200	0.600	0.700	0.200	0.100	0.150	0.200
Assets in different regions	0.050	0.050	0.200	0.500	0.700	0.050	0.050	0.050	0.050

Correlation between assets with different asset types in the same country

	Corp (local)	Corp (regional)	Corp (global)	SF (excluding CDO)	CDO	Project finance	IPF	Muni	Sovereign
Corp (local)	0.075	0.075	0.075	0.075	0.075	0.075	0.050	0.050	0.200
Corp (regional)		0.075	0.075	0.075	0.075	0.075	0.050	0.050	0.200
Corp (global)			0.075	0.075	0.075	0.075	0.050	0.050	0.200
SF (excluding CDO)				0.400	0.300	0.075	0.050	0.050	0.200
CDO					0.300	0.075	0.050	0.050	0.200
Project finance						0.075	0.050	0.050	0.200
International public finance (IPF)							0.150	0.150	0.200
Muni								0.050	0.200
Sovereign									

Correlation between assets with different asset types in the same region

	Corp (local)	Corp (regional)	Corp (global)	SF (excluding CDO)	CDO	Project finance	IPF	Muni	Sovereign
Corp (local)	0.075	0.075	0.075	0.050	0.075	0.075	0.050	0.050	0.100
Corp (regional)		0.075	0.075	0.050	0.075	0.075	0.050	0.050	0.100
Corp (global)			0.075	0.050	0.075	0.075	0.050	0.050	0.100
SF (excluding CDO)				0.300	0.300	0.050	0.050	0.050	0.100
CDO					0.300	0.075	0.050	0.050	0.100
Project finance						0.075	0.050	0.050	0.100
International public finance (IPF)							0.100	0.050	0.100

Table 10

Correlation Assumptions (cont.)

Muni								0.050	0.100
Sovereign									

Correlation between assets with different asset types in different regions

	Corp (local)	Corp (regional)	Corp (global)	SF (excluding CDO)	CDO	Project finance	IPF	Muni	Sovereign
Corp (local)	0.050	0.050	0.050	0.050	0.075	0.050	0.050	0.050	0.050
Corp (regional)		0.050	0.050	0.050	0.075	0.050	0.050	0.050	0.050
Corp (global)			0.050	0.050	0.075	0.050	0.050	0.050	0.050
SF (excluding CDO)				0.200	0.300	0.050	0.050	0.050	0.050
CDO					0.300	0.075	0.050	0.050	0.050
Project finance						0.050	0.050	0.050	0.050
International public finance (IPF)							0.050	0.050	0.050
Muni								0.050	0.050
Sovereign									

Correlation Override Table 1

Asset type	Asset type*	Within country correlation	Within region correlation	Between regions correlation
Corp	50	0.100	0.100	0.100
Project finance	50	0.100	0.100	0.100
Project finance	50C	0.100	0.100	0.100
International public finance	50C	0.100	0.100	0.100
Muni	50C	0.100	0.100	0.100
Sovereign	50C	0.700	0.600	0.500
Corp	63	0.075	0.075	0.050
Project finance	63	0.075	0.075	0.050
Project finance	50D	0.100	0.100	0.100
International public finance	50D	0.100	0.100	0.100
Muni	50D	0.100	0.100	0.100
Sovereign	50D	0.700	0.600	0.500

Correlation Override Table 2

Asset type*	Asset type*	Within country correlation	Within region correlation	Between regions correlation
7011000	1033403	0.100	0.075	0.075
7011000	7011000	0.250	0.250	0.200

Table 10

Correlation Assumptions (cont.)

7011000	7020000	0.250	0.250	0.200
7011000	7110000	0.250	0.250	0.200
7011000	7120000	0.250	0.250	0.200
7011000	7130000	0.250	0.250	0.200
7011000	7311000	0.100	0.075	0.075
7011000	7210000	0.250	0.200	0.150
7011000	50	0.100	0.100	0.100
7011000	50A	0.100	0.100	0.100
7011000	50B	0.100	0.100	0.100
7011000	50C	0.250	0.250	0.200
7011000	50D	0.100	0.100	0.100
7011000	51	0.100	0.075	0.075
7011000	52	0.100	0.075	0.075
7011000	53	0.100	0.075	0.075
7011000	56	0.100	0.075	0.075
7011000	59	0.100	0.075	0.075
7011000	60	0.100	0.075	0.075
7011000	62	0.100	0.075	0.075
7011000	63	0.250	0.250	0.200
7020000	1033403	0.250	0.250	0.200
7020000	7020000	0.250	0.250	0.200
7020000	7110000	0.250	0.250	0.200
7020000	7120000	0.250	0.250	0.200
7020000	7130000	0.250	0.250	0.200
7020000	7311000	0.250	0.250	0.200
7020000	7210000	0.250	0.200	0.150
7020000	50	0.100	0.100	0.100
7020000	50A	0.100	0.100	0.100
7020000	50B	0.100	0.100	0.100
7020000	50C	0.250	0.250	0.200
7020000	50D	0.100	0.100	0.100
7020000	51	0.100	0.075	0.075
7020000	52	0.100	0.075	0.075
7020000	53	0.100	0.075	0.075
7020000	56	0.100	0.075	0.075
7020000	59	0.100	0.075	0.075
7020000	60	0.100	0.075	0.075

Table 10

Correlation Assumptions (cont.)

7020000	62	0.100	0.075	0.075
7020000	63	0.250	0.250	0.200
7110000	1033403	0.100	0.075	0.075
7110000	7110000	0.250	0.250	0.200
7110000	7120000	0.250	0.250	0.200
7110000	7130000	0.250	0.250	0.200
7110000	7311000	0.100	0.075	0.075
7110000	7210000	0.250	0.200	0.150
7110000	50	0.100	0.100	0.100
7110000	50A	0.100	0.100	0.100
7110000	50B	0.100	0.100	0.100
7110000	50C	0.250	0.250	0.200
7110000	50D	0.100	0.100	0.100
7110000	51	0.100	0.075	0.075
7110000	52	0.100	0.075	0.075
7110000	53	0.100	0.075	0.075
7110000	56	0.100	0.075	0.075
7110000	59	0.100	0.075	0.075
7110000	60	0.100	0.075	0.075
7110000	62	0.100	0.075	0.075
7110000	63	0.250	0.250	0.200
7120000	1033403	0.100	0.075	0.075
7120000	7120000	0.250	0.250	0.200
7120000	7130000	0.250	0.250	0.200
7120000	7311000	0.100	0.075	0.075
7120000	7210000	0.250	0.200	0.150
7120000	50	0.100	0.100	0.100
7120000	50A	0.100	0.100	0.100
7120000	50B	0.100	0.100	0.100
7120000	50C	0.250	0.250	0.200
7120000	50D	0.100	0.100	0.100
7120000	51	0.100	0.075	0.075
7120000	52	0.100	0.075	0.075
7120000	53	0.100	0.075	0.075
7120000	56	0.100	0.075	0.075
7120000	59	0.100	0.075	0.075
7120000	60	0.100	0.075	0.075

Table 10

Correlation Assumptions (cont.)

7120000	62	0.100	0.075	0.075
7120000	63	0.250	0.250	0.200
7130000	1033403	0.100	0.075	0.075
7130000	7130000	0.250	0.250	0.200
7130000	7311000	0.100	0.075	0.075
7130000	7210000	0.250	0.200	0.150
7130000	50	0.100	0.100	0.100
7130000	50A	0.100	0.100	0.100
7130000	50B	0.100	0.100	0.100
7130000	50C	0.250	0.250	0.200
7130000	50D	0.100	0.100	0.100
7130000	51	0.100	0.075	0.075
7130000	52	0.100	0.075	0.075
7130000	53	0.100	0.075	0.075
7130000	56	0.100	0.075	0.075
7130000	59	0.100	0.075	0.075
7130000	60	0.100	0.075	0.075
7130000	62	0.100	0.075	0.075
7130000	63	0.250	0.250	0.200
7311000	7311000	0.700	0.550	0.450
7311000	7210000	0.100	0.075	0.050
7311000	50	0.300	0.300	0.300
7311000	50A	0.400	0.400	0.400
7311000	50B	0.300	0.300	0.300
7311000	50C	0.300	0.300	0.300
7311000	50D	0.300	0.300	0.300
7311000	51	0.400	0.300	0.200
7311000	52	0.400	0.300	0.200
7311000	53	0.400	0.300	0.200
7311000	56	0.400	0.300	0.200
7311000	59	0.300	0.050	0.050
7311000	60	0.150	0.100	0.100
7311000	62	0.150	0.100	0.100
7311000	63	0.400	0.300	0.200
1033403	1033403	0.700	0.550	0.450
1033403	7210000	0.100	0.075	0.050
1033403	50	0.300	0.300	0.300

Table 10

Correlation Assumptions (cont.)

1033403	50A	0.400	0.400	0.400
1033403	50B	0.300	0.300	0.300
1033403	50C	0.300	0.300	0.300
1033403	50D	0.300	0.300	0.300
1033403	51	0.400	0.300	0.200
1033403	52	0.400	0.300	0.200
1033403	53	0.400	0.300	0.200
1033403	56	0.400	0.300	0.200
1033403	59	0.300	0.050	0.050
1033403	60	0.150	0.100	0.100
1033403	62	0.150	0.100	0.100
1033403	63	0.400	0.300	0.200
1033403	7311000	0.700	0.550	0.450
7210000	7210000	0.250	0.200	0.175
7210000	50	0.100	0.100	0.100
7210000	50A	0.075	0.075	0.075
7210000	50B	0.075	0.075	0.075
7210000	50C	0.250	0.200	0.150
7210000	50D	0.100	0.100	0.100
7210000	60	0.100	0.100	0.100
7210000	63	0.250	0.200	0.150
USM2	6030000	0.200	0.200	0.050
USM5	9520000	0.200	0.200	0.050
USM5	9530000	0.200	0.200	0.050
USM5	9540000	0.200	0.200	0.050
USM5	9550000	0.200	0.200	0.050
USM5	9551702	0.200	0.200	0.050
PF1	3070000	0.200	0.200	0.050
PF2	4120000	0.200	0.200	0.050
PF3	2050000	0.200	0.200	0.200
PF4	1020000	0.200	0.200	0.200
PF4	1030000	0.200	0.200	0.200
PF5	1020000	0.200	0.200	0.050
PF5	1030000	0.200	0.200	0.050
PF5	9520000	0.200	0.200	0.050
PF5	9530000	0.200	0.200	0.050
PF5	9540000	0.200	0.200	0.050

Table 10

Correlation Assumptions (cont.)

PF5	9550000	0.200	0.200	0.050
PF5	9551702	0.200	0.200	0.050
PF7	8110000	0.200	0.200	0.200
PF7	9030000	0.200	0.200	0.200
PF8	3240000	0.200	0.200	0.050
PF8	3250000	0.200	0.200	0.050
USM2	USM2	0.200	0.200	0.050
USM5	USM5	0.200	0.200	0.050
50	59	0.200	0.200	0.200
50	60	0.150	0.150	0.150
50	62	0.100	0.100	0.100
50A	50A	0.800	0.800	0.800
50A	51	0.450	0.450	0.450
50A	52	0.450	0.450	0.450
50A	53	0.450	0.450	0.450
50A	56	0.450	0.450	0.450
50A	60	0.200	0.200	0.200
50A	62	0.200	0.200	0.200
50B	59	0.200	0.200	0.200
50B	60	0.150	0.150	0.150
50B	62	0.200	0.200	0.200
51	59	0.200	0.050	0.050
51	60	0.150	0.100	0.075
51	62	0.200	0.050	0.050
52	59	0.200	0.050	0.050
52	60	0.150	0.100	0.075
52	62	0.200	0.050	0.050
53	59	0.200	0.050	0.050
53	60	0.150	0.100	0.075
53	62	0.200	0.050	0.050
56	59	0.300	0.100	0.050
56	60	0.150	0.100	0.075
56	62	0.200	0.050	0.050
59	59	0.700	0.400	0.350
59	60	0.200	0.100	0.075
59	62	0.300	0.050	0.050
60	62	0.200	0.050	0.050

Table 10

Correlation Assumptions (cont.)

62	62	0.700	0.500	0.450
PF6	USM3	0.200	0.200	0.050
PF4	PF4	0.200	0.200	0.200
PF4	PF5	0.200	0.200	0.050
PF3	PF3	0.200	0.200	0.200
PF7	PF7	0.200	0.200	0.200
63	63	0.700	0.600	0.500
50A	63	0.450	0.450	0.450
53	63	0.700	0.600	0.500
56	63	0.700	0.600	0.500
59	63	0.300	0.100	0.075
60	63	0.250	0.250	0.200
62	63	0.200	0.075	0.075
50C	50C	0.700	0.700	0.700
59	50C	0.700	0.600	0.500
60	50C	0.250	0.250	0.200
62	50C	0.700	0.600	0.500
50D	50D	0.700	0.700	0.700
50C	50D	0.700	0.700	0.700
59	50D	0.700	0.600	0.500
60	50D	0.150	0.150	0.150
62	50D	0.700	0.600	0.500

*The seven-digit asset type codes represent global industry classification standard (GICS) codes for corporates, and they may be updated from time to time. The other codes reflect S&P Global Ratings' codes for other industries. The full description of these asset type codes can be found in table 12 in "CDO Evaluator General Parameters," March 27, 2017.

Appendix D: Tranche Rating Quantile for CDO Evaluator Default Simulation Model

Table 11

Tranche Rating Quantile For CDO Evaluator Simulation Model (%)

	Rating						
Tenor (year)	AAA	AA	A	BBB	BB	B	CCC
1	0.001	0.016	0.223	0.623	3.038	10.242	22.135
2	0.005	0.066	0.509	1.474	6.696	19.368	37.786
3	0.014	0.155	0.867	2.562	10.801	27.546	48.98
4	0.029	0.286	1.306	3.882	15.193	34.882	57.231

Table 11

Tranche Rating Quantile For CDO Evaluator Simulation Model (%) (cont.)

	Rating						
Tenor (year)	AAA	AA	A	BBB	BB	B	CCC
5	0.051	0.464	1.829	5.418	19.738	41.463	63.516
6	0.083	0.69	2.442	7.145	24.329	47.373	68.452
7	0.124	0.967	3.145	9.04	28.888	52.693	72.437
8	0.177	1.298	3.938	11.075	33.355	57.495	75.736
9	0.242	1.684	4.818	13.223	37.692	61.845	78.526
10	0.322	2.125	5.783	15.46	41.874	65.802	80.928
11	0.415	2.621	6.828	17.763	45.887	69.414	83.03
12	0.525	3.172	7.947	20.113	49.724	72.726	84.892
13	0.65	3.777	9.135	22.493	53.383	75.772	86.56
14	0.792	4.435	10.386	24.887	56.869	78.585	88.067
15	0.951	5.144	11.694	27.284	60.186	81.191	89.44
16	1.127	5.901	13.052	29.674	63.341	83.612	90.698
17	1.32	6.705	14.454	32.047	66.342	85.869	91.857
18	1.53	7.552	15.894	34.398	69.197	87.978	92.931
19	1.757	8.44	17.368	36.72	71.916	89.954	93.928
20	2	9.367	18.868	39.011	74.505	91.81	94.858
21	2.26	10.329	20.391	41.265	76.974	93.557	95.729
22	2.535	11.323	21.932	43.481	79.33	95.204	96.545
23	2.825	12.346	23.486	45.658	81.58	96.76	97.313
24	3.129	13.396	25.05	47.793	83.73	98.234	98.234
25	3.447	14.469	26.619	49.887	85.788	99.631	99.631
26	3.779	15.563	28.192	51.939	87.76	99.9	99.9
27	4.122	16.675	29.764	53.949	89.65	99.9	99.9
28	4.476	17.803	31.334	55.916	91.464	99.9	99.9
29	4.841	18.943	32.898	57.842	93.206	99.9	99.9
30	5.215	20.094	34.455	59.727	94.881	99.9	99.9

Appendix E: Proposed Guidance -- Credit And Cash Flow Assumptions

106. This proposed guidance is not proposed criteria, but it is intended to be read in conjunction with the proposed criteria set forth herein. We intend to publish this proposed guidance as a separate document following the publication of the finalized criteria article. For further information regarding guidance documents, please see paragraph 177.

OVERVIEW AND SCOPE

107. This guidance provides additional information and guidance relating to this "Request For Comment: Global Methodology And Assumptions For CLOs And Corporate CDOs" (proposed corporate CDO criteria) and our existing methodology, "Global Framework For Cash Flow Analysis of Structured Finance Securities" (global cash flow criteria), published Oct. 9, 2014. This document is intended to provide greater transparency on how we apply our credit and cash flow stresses.

GUIDANCE

108. When we analyze the credit and cash flow risks in a collateralized debt obligation (CDO) transaction, we take into consideration the provisions in the transaction's documents governing how the deal's risk profile is likely to evolve over time through reinvestment and what limitations or protective mechanisms there are. This may influence what assumptions we make.

109. Accordingly, in applying the proposed criteria, we may, in analyzing the credit risk and cash flow profile of a transaction, apply a "stable quality" approach or a "stressed portfolio" approach, depending on our assessment of these provisions (see the section titled "Additional Rating Considerations, Stable Quality Versus Stressed Portfolio Approach.")

110. We apply the "stable quality approach" to cash flow and hybrid CDOs where the manager commits to using S&P Global Ratings' CDO Monitor model as part of the reinvestment conditions, to monitor the quality of the portfolio (the CDO Monitor test). For synthetic CDOs, we apply the "stable quality approach" where the synthetic rated overcollateralization (SROC) test is used (see "CDO Spotlight: What Is A Synthetic CDO?," published April 30, 2010.)

111. Where we rate according to a "stressed portfolio" approach, we determine rating inputs and maturities based on the transaction's covenants rather than looking solely at the portfolio's actual characteristics. For such a transaction, we assume that the portfolio comprises the minimum number of obligors concentrated in the minimum number of industries permitted in the documents. In addition, we assume that the largest obligors are all in the same industry and have the lowest ratings allowed under the transaction documents' eligibility criteria. Finally, we assume that the portfolio has the minimum weighted-average spread and coupon allowed, and that it has the longest weighted-average life and lowest projected recoveries allowed under the transaction documents' eligibility criteria and reinvestment guidelines.

CREDIT RISK ANALYSIS

A. Determining inputs for use in the CDO Evaluator (see paragraph 21 in the proposed corporate CDO criteria)

Determining the rating input

112. According to our criteria, the corporate issuers' creditworthiness is a parameter of our credit analysis. When we use the CDO Evaluator to conduct our credit analysis, we therefore use a rating input for each issuer, which is based on information available to S&P Global Ratings. The following summarizes different sources of information and the order of priority in which we use them to determine the rating input for each asset. In a given portfolio, the rating input of each asset may

be determined using a different method as per below, depending on the type of information available to us:

- (i) If there is an S&P Global Ratings long-term credit rating on the issuer--or on an obligor in the same organizational hierarchy, as appropriate--then that rating is the S&P Global Ratings rating input.
- (ii) If a mid-market evaluation (MME) rating from S&P Global Ratings is available, then the rating input is the lowest corresponding S&P Global Ratings rating as described in table 14 of "Mid-Market Evaluation Rating Methodology," published Nov. 20, 2014. For instance, for MM1 and above, the rating input is 'BBB'; for MM7, the rating input is 'CCC-'.
- (iii) If a credit estimate from S&P Global Ratings is available, then the credit estimate is the S&P Global Ratings rating input.
- (iv) If no issuer credit rating or credit estimate is available, but any of the issuer's obligations are rated by S&P Global Ratings, then the S&P Global Ratings rating input is determined by notching up or down from the issue rating as follows: (A) If the rated issue is senior unsecured, the rating input is the S&P Global Ratings issue rating on the unsecured obligation; (B) If the rated issue is senior secured, the rating input is one notch below the S&P Global Ratings issue rating on the senior secured obligation; and (C) If the rated issue is subordinated, the rating input is one notch above the S&P Global Ratings issue rating on the subordinated obligation.
- (v) If a mapping has been provided by S&P Global Ratings for the collateral, the corresponding S&P Global Ratings rating input is determined pursuant to such mapping (see "Mapping A Third Party's Internal Credit Scoring System To Standard & Poor's Global Rating Scale ," published May 8, 2014).
- (vi) If there is a rating on the issuer from another nationally recognized statistical rating organization (NRSRO) that (1) is a public rating, and (2) is unqualified, then the corresponding S&P Global Ratings rating input is determined by applying the statistical analysis described in step 3 of our mapping criteria to the credit rating scale of the other NRSRO. The output of the analysis ("notched rating") is used to derive an adjustment to the other NRSRO's credit ratings. When the issuer or issue has ratings from multiple NRSROs, the lowest of all the notched ratings is used. The portion of the principal balance of the collateral that has S&P Global Ratings equivalent rating inputs assigned in this way may not exceed 15%. After applying the statistical method described here, we believe that a one-notch downward adjustment for investment-grade issuers and a two-notch downward adjustment for speculative-grade issuers to Moody's and Fitch's corporate ratings is appropriate.
- (vii) If (1) neither the issuer nor any of its affiliates is subject to insolvency, bankruptcy, or similar proceedings, and (2) all the issuer's obligations are current and the collateral manager believes they will remain current, then the corresponding S&P Global Ratings rating input for such an obligation is 'CCC-'.
- (viii) With respect to collateral obligations whose rating input cannot be determined using any of the steps described in subparagraphs (i) through (vii) above, then the corresponding S&P Global Ratings rating input is 'CC'.

113. For debtor-in-possession (DIP) financings, the issue point-in-time rating may be used as the S&P Global Ratings rating input for a maximum of 12 months from its initial assignment. However, we may further limit the use of the point-in-time rating if we believe that the credit quality of the DIP loan has deteriorated since its assignment. In order to make this assessment, we may request the collateral manager to provide information related to the DIP loan, such as amortization modifications, extensions of maturity, reductions of the principal amount owed, or nonpayment of

timely interest or principal due. We also request that the collateral manager provide us with any other information that, in his or her reasonable business judgment, may have a material adverse impact on the credit quality of the DIP asset.

114. For the purpose of determining the S&P Global Ratings rating input:

- If the rating assigned by S&P Global Ratings to an obligor or its obligations is on CreditWatch positive, such rating input will be treated as being one notch above the assigned rating.
- If the applicable rating assigned by S&P Global Ratings to an obligor or its obligations is on CreditWatch negative, such rating input will be treated as being one notch below the assigned rating.

B. Determining asset maturities used in the CDO Evaluator

115. According to our criteria, the tenor of the exposure to a corporate asset is a parameter of our credit analysis. When we use the CDO Evaluator to conduct our credit analysis, we therefore input a maturity date for each asset.

116. Where we base our analysis on the "stable quality" approach, we will generally use the final maturity of each loan in the portfolio for the purpose of our credit analysis. We may adjust some asset maturity inputs if the resulting pool's weighted-average maturity is less than the length of the reinvestment period.

117. We would then use this portfolio's weighted-average maturity, adjusted as per the paragraph above as appropriate, for those aspects of the criteria that refer to the portfolio's weighted-average maturity, for example to determine the default patterns and the pool's modeled amortization profile.

118. Where a "stressed portfolio" approach is used, we would determine the maturity date inputs based on the transaction's covenants.

C. Asset recovery assumptions (see paragraphs 47-54 of the proposed corporate CDO criteria)

Recovery rates based on recovery ratings

119. Table 12 presents our assumptions for assets with recovery ratings. In addition to the recovery rating, we may provide a recovery point estimate, which is used to signal whether an asset's expected recovery rate resides in the upper or lower end of the range for a given recovery rating. These recovery point estimates are always rounded down to the nearest 5%. For example, if we indicate that an asset has a '3' recovery rating with a recovery point estimate of 50%, this would indicate that the recovery rate assigned by these criteria will fall at the low end of the '3' recovery rating range. This means that, in this example, assuming a CDO target rating of 'AAA', the recovery rate input is 30%. Absent any such information, we will use the lowest range for that recovery rating in table 12.

Table 12

Recovery Rates For Assets With Recovery Indicators (%)

	Liability Rating						
Recovery Indicator	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1+ (100)	75.00	85.00	88.00	90.00	92.00	95.00	95.00
1 (95)	70.00	80.00	84.00	87.50	91.00	95.00	95.00
1 (90)	65.00	75.00	80.00	85.00	90.00	95.00	95.00
2 (85)	62.50	72.50	77.50	83.00	88.00	92.00	92.00
2 (80)	60.00	70.00	75.00	81.00	86.00	89.00	89.00
2 (75)	55.00	65.00	70.50	77.00	82.50	84.00	84.00
2 (70)	50.00	60.00	66.00	73.00	79.00	79.00	79.00
3 (65)	45.00	55.00	61.00	68.00	73.00	74.00	74.00
3 (60)	40.00	50.00	56.00	63.00	67.00	69.00	69.00
3 (55)	35.00	45.00	51.00	58.00	63.00	64.00	64.00
3 (50)	30.00	40.00	46.00	53.00	59.00	59.00	59.00
4 (45)	28.50	37.50	44.00	49.50	53.50	54.00	54.00
4 (40)	27.00	35.00	42.00	46.00	48.00	49.00	49.00
4 (35)	23.50	30.50	37.50	42.50	43.50	44.00	44.00
4 (30)	20.00	26.00	33.00	39.00	39.00	39.00	39.00
5 (25)	17.50	23.00	28.50	32.50	33.50	34.00	34.00
5 (20)	15.00	20.00	24.00	26.00	28.00	29.00	29.00
5 (15)	10.00	15.00	19.50	22.50	23.50	24.00	24.00
5 (10)	5.00	10.00	15.00	19.00	19.00	19.00	19.00
6 (5)	3.50	7.00	10.50	13.50	14.00	14.00	14.00
6 (0)	2.00	4.00	6.00	8.00	9.00	9.00	9.00

Note: If a recovery point estimate is not available for a given loan, we assume the lower range for the applicable recovery rating.

120. If an asset does not have a recovery rating, then we assess whether it is pari passu or subordinate to other debt that does have a recovery rating. This is necessary because it is possible, for example, that the CDO holds subordinated debt of a company that has senior secured debt with negligible recovery prospects (that is, a recovery rating of '6'). Because the debt with a recovery rating is senior to the instrument that the CDO holds, the recovery prospects for the instrument held by the CDO will very likely be less than the recovery prospects for the senior secured debt with the recovery rating.

121. If the CDO holds senior unsecured debt that does not have a recovery rating, and is subordinate to debt that has a recovery rating, then the recovery of the instrument can be determined using tables 13 and 14 below.

Recovery rates for assets junior to assets with recovery ratings

Table 13

Recovery Rates For Senior Unsecured Assets Junior To Assets With Recovery Ratings (%)

Group A

	CDO liability rating					
Senior asset RR	AAA	AA	A	BBB	BB	B/CCC
1+	18	20	23	26	29	31
1	18	20	23	26	29	31
2	18	20	23	26	29	31
3	12	15	18	21	22	23
4	5	8	11	13	14	15
5	2	4	6	8	9	10
6	-	-	-	-	-	-

Group B

	CDO liability rating					
Senior asset RR	AAA	AA	A	BBB	BB	B/CCC
1+	13	16	18	21	23	25
1	13	16	18	21	23	25
2	13	16	18	21	23	25
3	8	11	13	15	16	17
4	5	5	5	5	5	5
5	2	2	2	2	2	2
6	-	-	-	-	-	-

Group C

	CDO liability rating					
Senior asset RR	AAA	AA	A	BBB	BB	B/CCC
1+	10	12	14	16	18	20
1	10	12	14	16	18	20
2	10	12	14	16	18	20
3	5	7	9	10	11	12
4	2	2	2	2	2	2
5	-	-	-	-	-	-
6	-	-	-	-	-	-

The adjustments to the ranges from published reports as shown in table 12 do not apply to this table. RR-Recovery rating.

Table 14

Recovery Rates For Subordinated Assets Junior To Assets With Recovery Ratings (%)

Groups A & B

	CDO liability rating					
Senior asset RR	AAA	AA	A	BBB	BB	B/CCC
1+	8	8	8	8	8	8
1	8	8	8	8	8	8
2	8	8	8	8	8	8
3	5	5	5	5	5	5
4	2	2	2	2	2	2
5	-	-	-	-	-	-
6	-	-	-	-	-	-

Group C

	CDO liability rating					
Senior asset RR	AAA	AA	A	BBB	BB	B/CCC
1+	5	5	5	5	5	5
1	5	5	5	5	5	5
2	5	5	5	5	5	5
3	2	2	2	2	2	2
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-

The adjustments to the ranges from published reports as shown in table 12 do not apply to this table. RR-Recovery rating.

Recovery rates based on asset type

122. If a recovery rating is not available for use as described above, we apply table 15 below.

123. Table 15 shows the recovery assumptions for corporate and sovereign assets held in a cash flow CDO, based on the different corporate asset types (loans/bonds), and their seniority, security, and country groupings. Table 15 will also apply to assets that have an MME rating. However, these recovery rates could be lowered if the MME rating indicates that recovery prospects in the event of a default may be lower than the recovery rates in table 15.

Table 15

S&P Global Ratings Corporate Asset Recovery Rates For CDOs

Instrument/country grouping	CDO liability rating (%)					
	AAA	AA	A	BBB	BB	B/CCC
Senior secured first-lien loans						
A	50	55	59	63	75	79
B	39	42	46	49	60	63

Table 15

S&P Global Ratings Corporate Asset Recovery Rates For CDOs (cont.)

C	17	19	27	29	31	34
Senior secured cov-lite loans/senior secured bonds						
A	41	46	49	53	63	67
B	32	35	39	41	50	53
C	17	19	27	29	31	34
Mezzanine/second-lien/senior unsecured loans/senior unsecured bonds						
A	18	20	23	26	29	31
B	13	16	18	21	23	25
C	10	12	14	16	18	20
Subordinated loans/subordinated bonds						
A	8	8	8	8	8	8
B	8	8	8	8	8	8
C	5	5	5	5	5	5
	CDO liability rating					
Instrument/country grouping	AAA	AA	A	BBB	BB	B/CCC
Sovereign debt	37	38	40	47	49	50

124. Specifically, in applying the table above for super senior revolving loans (or super-priority revolving facility loans), we assume the senior secured loan recovery rates provided that the super senior revolving loan in the CLO is limited to a small percentage of the associated first-lien loan. In this case, we would expect the transaction documentation to limit the sum of the principal balance and unfunded commitments of these loans to a percentage (20% for example) of the sum of the revolving facility amount, plus the principal balance of the loan, plus the principal balance of any other debt that is pari passu with such loan.

125. In applying the table above for senior syndicated secured loans (uni-tranche loans), we apply a recovery rate assumption ranging between that for senior secured first-lien loans and that for second-lien loans. This is based on the assumption that these uni-tranche loans are generally secured by the same collateral package as the senior secured loan, and, prior to default, may receive payments on a pari passu basis with the senior secured loan, similar to first-lien last-out loans or bifurcated uni-tranche loans. Upon default, though, the lender will recover on a first-lien last-out basis. However, senior syndicated secured loan debt will be restricted on the basis of leverage or total loan-to-value, and the first-out tranche will not exceed a capped percentage of the total facility.

126. The country recovery grouping we apply in our analysis is found in Table 11 of "CDO Evaluator General Parameters," March 27, 2017, as updated from time to time.

127. When we conduct cash flow analysis as part of our surveillance of ratings, we use the current liability rating to estimate the ultimate expected recovery of a defaulted asset. This is in contrast to the way we analyze recovery rates in coverage ratios (see paragraph 197 in Appendix F).

Recovery for synthetic CDOs

128. Asset recovery rates are drawn independently from a beta distribution using the mean and

standard deviation from the synthetic recovery rates table below.

129. For synthetic CDOs, unless the terms of the credit derivative relating to deliverable obligations allow us to be more specific, we generally use the "senior unsecured bonds" asset type as our base-case recovery assumption, and we apply additional haircuts--or deductions--where the restructuring convention in the 1999 International Swaps and Derivatives Association's (ISDA) credit derivative definitions applies (also known as "old restructuring").

Table 16

Synthetically Referenced Recovery Rates (Use When Simulating SLRs)

	Corporate recovery rates (%)													
	Liability rating													
	AAA		AA		A		BBB		BB		B		CCC	
Country group	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev
Senior secured first-lien loan														
A	50	20	55	20	59	20	63	19	75	13	79	11	79	11
B	39	20	42	20	46	20	49	20	60	20	63	19	63	19
C	17	9	19	10	27	14	29	15	31	16	34	17	34	17
Senior secured first-lien cov.-lites loan														
A	41	20	46	20	49	20	53	20	63	19	67	17	67	17
B	32	16	35	18	39	20	41	20	50	20	53	20	53	20
C	17	9	19	10	27	14	29	15	31	16	34	17	34	17
Senior unsecured and second-lien loan														
A	18	9	20	10	23	12	26	13	29	15	31	16	31	16
B	13	7	16	8	18	9	21	11	23	12	25	13	25	13
C	10	5	12	6	14	7	16	8	18	9	20	10	20	10
Subordinated loan														
A	8	4	8	4	8	4	8	4	8	4	8	4	8	4
B	8	4	8	4	8	4	8	4	8	4	8	4	8	4
C	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5
Senior secured bond														
A	41	20	46	20	49	20	53	20	63	19	67	17	67	17
B	32	16	35	18	39	20	41	20	50	20	53	20	53	20
C	17	9	19	10	27	14	29	15	31	16	34	17	34	17
Senior unsecured bond														
A	18	9	20	10	23	12	26	13	29	15	31	16	31	16
B	13	7	16	8	18	9	21	11	23	12	25	13	25	13
C	10	5	12	6	14	7	16	8	18	9	20	10	20	10
Subordinated bond														
A	8	4	8	4	8	4	8	4	8	4	8	4	8	4
B	8	4	8	4	8	4	8	4	8	4	8	4	8	4
C	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5

Table 16

Synthetically Referenced Recovery Rates (Use When Simulating SLRs) (cont.)

	Sovereign recovery rates (%)													
	Liability rating													
	AAA		AA		A		BBB		BB		B		CCC	
Country group	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev
A	37	19	38	19	40	20	47	20	49	20	50	20	50	20
B	37	19	38	19	40	20	47	20	49	20	50	20	50	20
C	37	19	38	19	40	20	47	20	49	20	50	20	50	20

SLR--Scenario loss rate. Std dev--Standard deviation. Cov. lite-- Covenant lite. CDO--Collateralized debt obligation. O/C--Overcollateralization. N/A--Not applicable.

D. Cash Flow Modeling Assumptions

130. The following provides insight into the analysis that we employ in the cash flow modeling of CDO transactions. It expands on the methodology described in the proposed corporate CDO criteria and global cash flow criteria. For the purpose of our cash flow analysis of corporate CDO transactions, we typically use our Cash Flow Evaluator model.

131. CDO transaction structures and collateral eligibility can vary significantly from transaction to transaction. We modify the general assumptions that follow to fit the unique circumstances of each transaction. While comprehensive, this guidance does not attempt to cover all the cash flow modeling stresses that might be applied to any particular transaction.

Determining the maturity and amortization profiles in the Cash Flow Evaluator (see paragraph 56 in the proposed corporate CDO criteria)

132. **During the reinvestment period.** For transactions that are still within their reinvestment period, given the active management of the portfolios, the initial portfolio maturity profile could change over this period and differ significantly from that at the end of the reinvestment period. Based on our observations of the historical amortization profile, we have therefore derived standardized amortization curves that we use in our cash flow analysis for portfolios with a weighted-average maturity ranging from four to seven years. We will typically apply these curves such that the weighted-average maturity using this amortization profile will be as close as possible to the portfolio's weighted-average maturity that was determined to assess credit risk using the CDO Evaluator.

Table 17

Standard Amortization Curves

Asset payment period	Quarterly pay assets (%)	Semiannual pay assets (%)
1	2	5
2	3	11
3	5	17
4	6	23

Table 17

Standard Amortization Curves (cont.)

Asset payment period	Quarterly pay assets (%)	Semiannual pay assets (%)
5	7	21
6	10	13
7	11	8
8	12	2
9	11	
10	10	
11	7	
12	6	
13	5	
14	3	
15	2	

133. Where other factors may lead to an atypical amortization profile, we may construct specific amortization profiles reflecting those factors, depending on the asset pool's maturity, the length of the reinvestment period, and the maximum covenanted weighted-average life, for example.

Post the reinvestment period

134. For transactions that are past their reinvestment period, we will generally assume the actual portfolio maturity profile. We do so because after the reinvestment period, the transaction can become relatively static and collateral managers are not typically permitted to reinvest the scheduled principal proceeds. However, to the extent that the transaction documents allow the manager some flexibility in reinvesting certain proceeds after the end of the reinvestment period, we may also consider other amortization profiles, including those typically used in reinvestment periods, in our cash flow analysis.

135. The cash flow modeling for a given transaction may show that there are insufficient proceeds to pay full interest on nondeferrable tranches. If we believe these interest shortfalls are due solely to the modeled portfolio amortization profile, we may make minor adjustments to it. This is based on observations that collateral managers typically forecast and manage cash flows by adjusting portfolio maturities, holding back on reinvestments, and selling assets to avoid such shortfalls. Historically, we understand that managers have not invested 100% of their available cash and have maintained small amounts of cash on hand.

Default timing and patterns (see paragraph 56 of the proposed corporate CDO criteria and paragraphs 19-21 of the global cash flow criteria)

136. We determine default timing and patterns considering the pool's and the transaction's characteristics, in particular, the portfolio's credit quality and weighted-average maturity. We generally model annual default amounts spread out in each note payment period. We additionally assume that assets do not pay interest to the CDO in the period in which they default.

137. For typical CLO pools of leveraged loans issued by speculative-grade issuers with weighted-average maturities ranging from four to seven years, we will typically run four default patterns starting in year one (see table 18). We believe that these patterns, which are modeled at

the start of the transaction, appropriately stress the amount of excess spread that would be available to the equity component of combination notes.

Table 18

Annual Defaults As A Percentage Of Cumulative Defaults (%)

Default Pattern	Year 1	Year 2	Year 3	Year 4	Year 5
1	39	22	16	13	10
2	16	23	26	22	13
3	12	18	22	23	25
4	20	20	20	20	20

138. For shorter or longer tenors, we would adjust these patterns to better match these pools' maturity profiles. For example, for three-year weighted-average maturity portfolios, we would typically run the following patterns:

Table 19

Annual Defaults As A Percentage Of Cumulative Defaults (%)

Default Pattern	Year 1	Year 2	Year 3
1	50	25	25
2	25	50	25
3	25	25	50
4	33	33	34

139. For transactions with pro rata payment features, we may apply additional default patterns, for example, to test the ability of the transaction to withstand back-loaded defaults.

Interest rate patterns (see paragraph 56 of the proposed corporate CDO criteria and paragraphs 30 and 51-54 of the global cash flow criteria)

140. To assess whether a transaction will be able to perform in varying interest rate environments, we generally apply five interest rate scenarios to each default pattern. These scenarios (excluding the forward curve) are derived using Cox-Ingersoll-Ross methodology that simulates interest rate curves at various confidence levels depending on the rating scenarios in order to project future interest rate movements. The five interest rate scenarios are as follows:

- Forward curve;
- Rising interest rates (up curve);
- Falling interest rates (down curve);
- Rising then falling interest rates (up/down curve); and
- Falling then rising interest rates (down/up curve).

Interest income on eligible investments (see paragraph 30 of the global cash flow criteria)

141. Proceeds received from assets in the form of scheduled principal and interest payments and recovery proceeds are generally held in eligible investments before being reinvested in substitute collateral or being used to pay liabilities on a payment date.

142. In our cash flow analysis, we assume that scheduled principal and interest proceeds are held in eligible investments for one-half of the collection period before being reinvested in substitute collateral. Additionally, since we also assume that recoveries are received at the end of a payment period, we do not model any interest earned on recovery proceeds in the period in which they are received.

143. We assume that interest is earned on the regular payments received from the eligible investments at a rate equal to the index referenced minus 100 basis points with a floor of 0%. In instances where transactions may use proceeds to pay interest on eligible investments as a result of negative interest rates, we may consider applying additional stresses, absent any mitigating factors.

Payment timing mismatch (see paragraph 56 of the proposed corporate CDO criteria and paragraph 30 of the global cash flow criteria)

144. It is common for cash flow CDO transactions to include a bucket for assets that pay less frequently than the liabilities. In many instances, transactions use an interest reserve mechanism or enter into a basis swap to address this mismatch. In the absence of a mechanism that we believe mitigates this liquidity risk, we may model the mismatch by modeling the maximum concentration limitations of the assets that pay less frequently than the liabilities.

Foreign exchange risk analysis (see paragraphs 60-62 of the proposed corporate CDO criteria)

145. Where structures only partially mitigate the foreign-exchange risk, for example through the use of a natural hedge, and/or of derivatives (such as swaps with predetermined notional options), we run additional cash flow stresses to capture the foreign-exchange risk in the rating analysis.

146. A natural foreign-exchange hedge exists when both the assets and liabilities denominated in each currency make up the same proportion of a given pool. For instance, the collateral pool may have 70% euro-denominated and 30% U.S. dollar-denominated assets matched to 70% euro-denominated and 30% U.S. dollar-denominated liabilities. However, this natural hedge often does not immunize the CDO against foreign-exchange risk. This hedge remains perfectly balanced so long as defaults to the assets occur pro rata across the currency denominations. If defaults do not occur in proportion (the more likely scenario), the resulting imbalance would throw the natural hedge askew. The balance of the natural hedge could also be upset by principal payments on the assets or diversion of payment proceeds to pay down liabilities in a sequential pay structure triggered by the breach of a coverage test.

147. Residual foreign-exchange risk may also exist with the use of certain derivatives. For example, if an issuer enters into a foreign-exchange swap with a predetermined notional balance, the transaction is likewise susceptible to hedging imbalances.

148. To bias defaults, we use the following formula, where X represents the currency bucket that defaults are biased toward (expressed as a percentage of the portfolio), and Y the magnitude of the default bias: FX Default Bias=(Y*X)/(Y-1+X).

149. In applying the default biasing formula, we typically use a Y value expressed as an integer ranging from 2 (most stressful) to 4 (least stressful) to reflect our overall assessment of the potential

sensitivity of a transaction to currency mismatches based on the parameters set out in the criteria.

150. When reviewing the coverage tests, we would, for example, consider the exchange rate at which foreign currency denominated assets are carried. In this regard, we typically believe that coverage tests in which assets are carried at the then-relevant spot rate of exchange at any point in time are more protective of noteholders than those where the assets are carried at a given predetermined rate of exchange. While the latter may increase the stability of the coverage ratios, we also consider that the ratios become less predictive of the true value of the collateral at any given point in time, increasing the potential risk to the noteholders.

151. When reviewing the reinvestment guidelines, we consider how specific provisions relating to the reinvestment of proceeds from assets may be used and any other feature of management agreements that we believe have a bearing on the level of risk the noteholders may be exposed to as a direct result of the currency mismatch in the transaction. An example of a provision we have seen that we view as increasing the risk is the manager's ability to reinvest payment/sale proceeds from assets in one currency into assets in a different currency, as these trades have the potential to erode par as the result of foreign-exchange risk.

152. We typically apply a Y value of 4 where the following conditions are met:

- The magnitude of the currency exposure is small;
- Coverage ratios carry currency assets at the then-relevant spot rate of exchange at any point in time; and
- Reinvestment conditions, in our view, significantly limit the manager's ability to increase the transaction's exposure to foreign-exchange risk.

153. When derivatives are used to partially mitigate foreign-exchange risk, we may also perform additional analysis to assess their effectiveness in mitigating foreign-exchange risk over time. For example, we may want to consider whether the benefit from such derivatives in hedging the transaction may fluctuate significantly over time.

154. We may consider an exposure minimal and not incorporate it into our cash flow analysis if, for example, foreign-exchange exposure arises from the documents, allowing the manager a time lag before entering into perfect asset swaps in relation to foreign-currency assets it has purchased. In this case, we would expect the time that the assets remain unhedged to be short (typically no longer than six months) and the proportion of unhedged assets at any given point in time to be limited (typically 2%-3%). In addition, we expect these assets' adjusted par in the coverage test to reflect the embedded foreign-exchange risk and would consider this value in light of our view of foreign-exchange risk over the unhedged period.

155. In addition to the hedging of the periodic payments, our analysis depends on whether the foreign-exchange strategy remains in place to cover the recoveries realized on the defaulted securities. Automatic termination of the foreign-exchange swap upon default of an asset exposes the recoveries to foreign-exchange risk and potential termination costs. We typically adjust the recovery rate assigned when the swap is required to terminate before the time we believe recoveries will be received. The magnitude of this adjustment is determined according to factors such as the length of time the defaulted asset is exposed to foreign-exchange risk and the particular currencies involved.

156. Foreign-exchange risk also arises when an asset is sold, but the asset-specific foreign-exchange swap is not automatically retired, or, conversely, the foreign-exchange swap terminates before the asset matures. In the first instance, the collateral manager is likely to include the economic effect of the swap in making its sell decision, and, in the latter, the manager might sell the unhedged

asset to eliminate foreign-exchange concerns. In both cases, noncredit-based considerations are factored into the decision process, and we consider adjusting the recovery rate assigned.

Pay-in-kind (PIK) assets (see paragraph 56 of the proposed corporate CDO criteria and paragraph 30 of the global cash flow criteria)

157. When more than 5% of the assets in a portfolio by par balance have the ability to pay in kind, we apply a PIK stress test to assess the ability of the CDO transaction to make payments on the notes despite the liquidity stress, and/or assess the adequacy of any mitigation schemes, such as liquidity facilities. We determine the PIK stress after taking into account the transaction structure and targeted portfolio profile. We typically do this only for the cash flow scenario yielding the lowest break-even default rate (BDR) to test that the notes would be able to be paid in the rating scenario considered. However, we would assess the minimum BDR without running this stress. For example, a transaction that allows for the purchase of PIK assets up to 7.5% of the portfolio by par balance would be subject to a PIK stress on 2.5%--the amount in excess of 5% and not the entire 7.5% permitted under the documents.

Corporate mezzanine loans (see paragraph 56 of the proposed corporate CDO criteria and paragraphs 30 and 51-54 of the global cash flow criteria)

158. Corporate mezzanine loans are common to many European leveraged loan CDO transactions. These loans have a junior secured position and typically have two components to their interest payments--a current-pay coupon and a PIK coupon. The latter coupon is structured in the loan documents to pay in kind from day one and accrues to principal; in effect, it behaves like a zero coupon bond.

159. We give credit to the accrued portion of the PIK coupon component in the cash flow modeling, subject to the following conditions:

- For the purpose of the coverage tests, we expect accrued PIK interest to be included in the overcollateralization test, provided that the accrued interest is consistently treated as principal proceeds. We do not expect any credit to be given in the interest coverage test because no interest is received in cash during the payment periods.
- We will look to the asset eligibility guidelines and transaction covenants for a minimum mezzanine loan bucket and a minimum PIK interest rate for the mezzanine loans to incorporate accrued PIK interest in our cash flow analysis.
- For the purposes of default and recovery, the defaulted balance is calculated as the product of the asset default rate and the par balance, inclusive of the accrued PIK interest. The recovery balance is calculated as the product of the recovery rate and the base par, excluding the accrued PIK balance.

E. Supplemental Tests (see paragraphs 65-78 of the proposed corporate CDO criteria)

160. We use our CDO Evaluator model to apply the following standard supplemental tests, as described below. According to the criteria, adjustments may be made to these standard tests, such as specified combinations of defaults of the largest obligors and industries as an alternative supplemental test if we believe that better addresses the transaction's specific risk profile. For

example, this may be the case if the portfolios are either not well-diversified or have started amortizing after the reinvestment period, and show higher obligor or industry concentration.

Largest obligor test

161. In applying this test, we generally assume a flat recovery rate for all assets of 5% to address event risk. In exceptional cases, for example, where the entire collateral pool structurally can only comprise assets with the highest recovery ratings, we may use a higher assumption. For sovereign assets, the recovery rate used to calculate the largest obligor default test is 25%.

162. For example, we would expect a 'AAA' rated tranche to have sufficient credit enhancement to survive the highest level of losses associated with the defaults of each of the following combinations of underlying obligors, assuming 5% recovery (for sovereign assets, the recovery rate used for the purpose of this test is 25%):

- The two largest obligors rated between 'AAA' and 'CCC-';
- The three largest obligors rated between 'AA+' and 'CCC-';
- The four largest obligors rated between 'A+' and 'CCC-';
- The six largest obligors rated between 'BBB+' and 'CCC-';
- The eight largest obligors rated between 'BB+' and 'CCC-';
- The 10 largest obligors rated between 'B+' and 'CCC-'; and
- The 12 largest obligors rated between 'CCC+' and 'CCC-'.

163. For transactions that do not employ excess spread, such as synthetic CDOs, we consider whether the attachment point is set sufficiently high to withstand the highest losses from the obligor test without breaching the rated tranche's loss attachment point.

164. In cases where we apply this test by running our cash flow modeling according to the criteria, if the transaction allocates principal pro rata, we would apply the default rate derived from the application of the largest obligor or industry tests at different times during the life of the transaction on a prospective basis.

165. For this test, we would treat all obligors rated below 'CCC-' and still included in the CDO asset pool to have defaulted. Also, in applying this test, the value we assume for defaulted assets already held by the CDO is the lower of our recovery assumption or the current market value. For defaulted synthetic reference obligors, the value we assume is the respective recovery value shown in table 16 until the actual recoveries are determined through the International Swaps and Derivatives Association protocol or the applicable valuation mechanism detailed in the transaction documents. If the transaction documents specify fixed recoveries, we use the fixed recovery amounts.

Largest industry test

166. In the primary largest industry test, we would expect corporate CDO tranches rated 'AAA' or 'AA' to be able to withstand the default of all obligors in the largest single industry in the asset pool with a 17% recovery rate. For this test, we use the same industry classifications as in the CDO Evaluator. For example, assume a transaction has a 12% concentration in the largest industry. Under the test, a tranche rated 'AAA', 'AA+', 'AA', or 'AA-' in such a transaction should have sufficient credit enhancement to survive the default of 9.96% (12% industry concentration [100%-17% recovery]) of the asset pool. This is applicable even if the CDO Evaluator simulation model indicates that a

lower level of credit enhancement would be sufficient.

167. The 17% assumption is the same recovery rate that we assign to senior secured debt from Group C countries (see the "Asset Recovery Assumptions" section earlier in this article).

168. We may still assign a rating of 'AAA' or 'AA' to a tranche even though it fails the primary largest industry test if it passes the following alternative largest industry default test. The flat recovery assumption for this test is 5%.

F. Qualitative factors and additional testing for nondiversified or nonstandard portfolios (see paragraphs 26-27 in the proposed corporate CDO criteria)

169. The standard modeling assumptions and stresses described in our proposed criteria are applicable to the majority of CDO transactions that are typically well-diversified portfolios across obligors, industries, and asset characteristics. In addition to our standard assumptions, we will also consider other qualitative and quantitative factors and may assess additional scenarios for portfolios that may be atypical or not well-diversified. This could include transactions where portfolios show a high concentration of obligors, industries, or certain types of assets, or where the portfolios are lumpy, with a large variance of spreads and recoveries.

170. **Changes to correlation assumptions.** We may modify some of our modeling assumptions or apply stresses for portfolios that could show heightened sensitivity to some of our modeling parameters. For example, for portfolios that are highly concentrated in one or a few industries, in addition to running the largest industry test, we may also run additional correlation scenarios to test lower and/or higher correlation assumptions than those we typically assume. Table 20 gives an example of the overrides we may make to our correlation assumptions.

Table 20

Correlation Scenarios

	Within industry	Between industries
Lower correlation assumption	0.150	0.050
Criteria assumption	0.200	0.075
Higher correlation assumption	0.250	0.100

171. The above scenarios are for industries that display the 0.200 intra-industry and 0.075 inter-industry correlations. As part of this analysis, we also make adjustments to the industry correlation override tables for correlations both higher and lower that the criteria assumptions.

172. In order to adjust the correlation for the higher correlation scenario, if the original correlation is less than 0.10, we would increase it by 0.025, and if it is greater than or equal to 0.10, we would increase it by 0.05. If the original correlation is less than or equal to 0.99, we would cap the adjusted correlation at 0.99. If the original correlation is greater than 0.99, we would set the adjusted correlation to the same value as the original correlation.

173. In order to adjust the correlation for the lower correlation scenario, if the original correlation is less than 0.10, we would decrease it by 0.025, and if it is greater than or equal to 0.10, we would decrease it by 0.05. If the adjusted correlation is less than zero, we would floor the correlation at zero.

174. **Adjustments to recovery rates.** Empirical evidence suggests that the recovery rates for corporate assets are influenced by the level of defaults in the economy and the lending standard employed before entering the economic/default cycle. We have also observed considerable variation in recoveries within a given origination or default vintage. To the extent we see such variation, we may assess additional scenarios with 10% positive and negative adjustments to recoveries relative to a transaction's weighted-average recovery.

175. **Default biasing:** Most CDO transactions are modeled based on the general pool characteristics, with pro-rata defaults applied across all assets, as asset composition in CDO pools tends to be fairly uniform around the mean. For portfolios that are lumpy or bar-belled, or have a concentration exposure to certain assets, we may consider default bias scenarios for:

- The largest assets in the pool;
- The assets in the pool with the highest spread;
- The fixed-rate buckets of assets; and
- The assets in the pool with the lowest base-case recoveries.

176. Where we bias default, we will typically apply defaults to the largest assets, assets with the highest spread, assets that pay a fixed rate of interest or assets that have the lowest base-case recoveries, as appropriate, in our cash flow analysis.

177. This appendix provides additional information and guidance to these proposed criteria, and we expect to publish this information and guidance in a separate guidance document following the publication of the finalized criteria article. It is intended to be read in conjunction with the proposed criteria herein and aforementioned cash-flow criteria. Guidance documents are not criteria, as they do not establish a methodological framework for determining credit ratings. Guidance documents provide guidance on various matters, including articulating how we may apply specific aspects of criteria; describing variables or considerations related to criteria that may change over time; providing additional information on non-fundamental factors that our analysts may consider in the application of criteria; and providing additional guidance on the exercise of analytical judgment under our criteria. Our analysts consider guidance documents as they apply criteria and exercise analytical judgment in the analysis and determination of credit ratings. However, in applying criteria and the exercise of analytic judgment to a specific issuer or issue, analysts may determine that it is suitable to follow an approach that differs from one described in the guidance document. Where appropriate, the rating rationale will highlight that a different approach was taken. For more information about guidance documents please see "Criteria And Guidance: Understanding The Difference" in Related Research below.

Appendix F: Proposed Guidance -- Transaction Document Analysis

178. This proposed guidance is not proposed criteria, but it is intended to be read in conjunction with the proposed criteria set forth herein. We intend to publish this proposed guidance as a separate document following the publication of the finalized criteria article. For further information regarding guidance documents, please see paragraph 295.

OVERVIEW AND SCOPE

179. This guidance provides additional information and guidance relating to this "Request For Comment: Global Methodology And Assumptions For CLOs And Corporate CDOs" (proposed

corporate CDO criteria). This guidance document provides additional information and guidance relating to "Counterparty Risk Framework: Methodology And Assumptions" (counterparty criteria), published March 8, 2019, "Principles For Rating Debt Issues Based on Imputed Promises," Dec. 19, 2014 (imputed promises), "Methodology: Criteria For Global Structured Finance Transactions Subject To A Change In Payment Priorities Or Sale Of Collateral Upon A Nonmonetary EOD," March 2, 2015, and "Structured Finance: Asset Isolation And Special-Purpose Entity Methodology," March 29, 2017. This document should be read in conjunction with these criteria and is intended to provide greater transparency about their application on how the criteria are applied with respect to various provisions in corporate CDO transaction documents.

GUIDANCE

A. Reinvestment Provisions (see criteria paragraphs 79-81 of the proposed corporate CDO criteria)

180. Most cash flow CDO transactions are actively managed. The CDO transaction documents establish the parameters within which the collateral manager can modify the collateral portfolio through trading and reinvestment. Collateral managers generally seek to maximize trading and reinvestment flexibility. Although this increased flexibility might help collateral managers balance the needs of debt and equity holders, S&P Global Ratings believes that certain collateral characteristics are key to mitigating the risks to the transaction's ability to pay the rated debt. Generally, the overarching premise of a managed CDO is to preserve the aggregate collateral par amount and credit quality of the assets when trading, while balancing yield, tenor, and prospects for recovery. In reviewing all reinvestment provisions, we generally focus our analysis on the ability to substitute assets within the parameters described in the transaction documents and the extent to which credit enhancement may be eroded. The following are examples of how we view reinvestment provisions in CDO transactions we rate based on the "stable quality approach," which use S&P Global Ratings' CDO Monitor model as a condition to reinvestment. We refer to this as the CDO Monitor test in the rest of this document.

Table 21

Summary Of Typical Trading Provisions During Reinvestment Period: Conditions To Reinvest Proceeds

Sources of proceeds:	OC tests	New asset minimum par amount	CDO Monitor test
Discretionary and credit improved	Satisfy, maintain, or improve	Par	Satisfy, maintain, or improve
Credit risk	N/A	Sale proceeds	N/A
Defaulted (including recovery)	Satisfy	Sale or recovery proceeds	N/A
Equity	—	Sale proceeds	—
Unscheduled principal	Satisfy, maintain, or improve	Par	Satisfy, maintain, or improve
Scheduled principal	Satisfy, maintain, or improve	Par	Satisfy, maintain, or improve

Table 22

Summary Of Typical Trading Provisions After Reinvestment Period: Conditions To Reinvest Proceeds

Sources of proceeds:	OC tests	New asset minimum par amount	New asset with equal or higher rating*	New asset with same or shorter maturity§
Credit risk	Pass	Sale proceeds	Yes	Yes
Credit improved	Pass	Par	Yes	Yes
Unscheduled principal	Pass	Par	Yes	Yes
Other sources	Not permitted	Not permitted	N/A	N/A

*Or maintain or improve portfolio SDRs. §Or maintain or shorten portfolio weighted average maturity. OC--Overcollateralization. N/A--Not applicable.

Principal Collateral Maintenance

181. Par maintenance:

- During the reinvestment period, generally, proceeds from discretionary and credit-improved sales are expected to be reinvested such that the new asset par amount after the reinvestment is maintained.
- After the reinvestment period, if the collateral manager chooses to reinvest rather than pay down the notes, we generally expect proceeds from credit-improved and unscheduled amortization to be reinvested such that the new asset par amount after reinvestment is maintained or improved.

182. Par for sales proceeds:

- During the reinvestment period, generally, reinvestment of sale proceeds received from defaulted obligations and equity securities only need to have a par value equal to the related sales proceeds.
- During and after the reinvestment period, we generally expect proceeds from the sale of credit risk obligations to be reinvested such that their par value equals their sales proceeds.

183. CDO documentation may also allow for the principal collateral amount to not be maintained if the manager has built sufficient excess par in the transaction such that the aggregate performing collateral balance plus recovery on defaults is greater or equal to the reinvestment target par of the portfolio after the trade. Here, we refer to the "reinvestment target par" as the initial target par amount after accounting for any additional issuance, and any reduction from principal payments made on the notes.

184. After the reinvestment period, we generally expect the proceeds of discretionary sales, defaulted obligations, equity securities, and scheduled principal proceeds to be used to pay down the notes.

Coverage Tests, CDO Monitor Test, Or SDR Test

185. For all proceeds reinvested except for proceeds from the sale of credit risk, equity, and defaulted obligations, we expect the CDO Monitor test to be satisfied, maintained, or improved.

186. After the reinvestment period, the CDO Monitor no longer applies and we would look for the new

obligation to have (a) the same or higher rating and (b) the same or shorter maturity than the one sold. As an alternative to (a) and (b) above, we would consider an obligation to maintain or improve the portfolio's scenario default rate (SDR). Similarly, we view maintaining or improving the weighted average maturity of the portfolio after giving effect to the purchase as generally equivalent to the "same or shorter maturity" provision.

187. Generally, other conditions for reinvestment mandate the assessment of the coverage tests. The coverage tests usually include overcollateralization (OC) and interest coverage (IC) triggers. During the reinvestment period, we would expect the coverage tests to be satisfied, or if not satisfied, to be at least maintained or improved. Typically, after the reinvestment period, we would expect the coverage tests to be satisfied as the transaction should be deleveraging. Where we observe indenture language that introduces scenarios where the tests may not apply, we may choose not to consider those tests in our cash flow modeling.

Trading Plans

188. Some transactions allow for the assessment of trading parameters based on a series of trades (rather than on an asset-by-asset basis), which are typically referred to as trading plans.

189. Trading plans allow the collateral manager to sell and purchase a group of assets that do not fully meet the transaction's reinvestment guidelines individually but are expected to satisfy them after evaluating the bundling of several trades of eligible assets together that have offsetting characteristics. Generally, trading plans a) are limited to a small percentage of the collateral pool, typically 5%; b) do not extend past any determination date; c) have a time limit for completion (typically 10 days in U.S. transactions and 15 days in European transactions); and d) are limited to only one active trading plan at one time.

B. Coverage Tests: (see paragraph 79 in proposed corporate CDO criteria)

190. In reviewing provisions governing coverage tests, we review the calculation of the numerator and the way certain types of assets are treated (see the "Treatment of certain types of assets" section below). We additionally consider whether all relevant liabilities are included in each coverage test's denominator, particularly including the event of certain note cancellations (see "Note cancellation without payment" section below).

Treatment of certain types of assets

191. Generally, in a cash flow CDO structure, certain classes of notes have a corresponding OC test. Typically, the OC test ratio is determined by dividing the adjusted principal balance of the assets (including any cash amounts representing principal proceeds) in the CDO portfolio by the sum of the aggregate principal balances of the CDO notes of the relevant class (including any deferred interest where applicable), and all other classes of notes that rank senior or pari passu. Generally, when the numerator of the OC test includes principal proceeds, these amounts are included so long as there is no duplication with proceeds in other accounts already included in the calculation, and such amounts may not be reclassified as interest proceeds.

192. Typically, the adjusted principal balance of the assets included in the numerator of the OC tests equals their par amount. However, in certain instances, where the assets are considered riskier, the carrying value in the OC test is reduced by haircuts. Since each of these assets is valued at less than its par value for purposes of calculating the OC tests, the presence of such loans in a portfolio will lower the numerator of the OC tests, thereby increasing the probability of triggering

an OC test failure and an early deleveraging of the senior notes.

193. We typically expect certain adjustments to the principal balance of specific asset types in the calculation of the OC test numerator (see table 23). We discuss some of these assets in greater detail in the following paragraphs.

Table 23

Summary Of Expected Adjusted Par Value Of Assets In OC Numerator

Type of assets	Adjusted par value
Defaulted or deferring	Lesser of market value and S&P Global Ratings recovery assumption
Discount obligations	Purchase price
Excess 'CCC' obligations	70% of par or market value (choice to be made at closing)
Long-dated obligations	Excess over 5% of the portfolio at 10% discount rate per year beyond legal final maturity date
Zero-coupon obligations	Accreted Value
Closing date participations (not elevated to assignment by effective date)*	S&P Global Ratings recovery assumption

*See section below on participations.

194. When an asset included in the calculation of the OC test can be eligible for two or more haircuts, we typically expect to see that the highest haircut is applicable (resulting in the lowest carrying value).

Defaulted obligations

195. In accordance with S&P Global Ratings' corporate default study, we consider defaulted obligations to be those a) where there has been a default in the payment of principal and/or interest on the issuer's obligation or obligations senior/pari passu to such defaulted obligation; b) where the issuer has become subject to a bankruptcy or insolvency proceeding (as applicable); or c) where the issuer has an issuer credit rating of 'CC', 'D' or 'SD' or had such a rating prior to withdrawal. If any of these conditions is met, we expect an obligation to be treated as defaulted. However, in our analysis, we may consider certain defaulted obligations as performing if they meet specific conditions. The exceptions are typically debtor-in-possession (DIP) loans, current pay obligations, and distressed exchange current pay obligations.

196. Other than such exceptions, we expect that, for the purpose of the OC test and the reinvestment conditions, all defaulted obligations will generally be carried at the lower of a) their assigned recovery rate multiplied by their defaulted principal balance or b) their current market value. Where transactions treat assets that pay in kind for a defined time period as defaulted assets, the recovery rate or market value rate is applied to the PIK asset's original par principal balance, not its principal plus accrued interest balance.

197. Our recovery rate assumptions are tiered, based on the rating scenario considered for each CDO tranche. Generally, the recovery rates used in the coverage tests are those applicable for the original rating on the liability. In such cases, the documents specify that one set of fixed recovery rates would apply for the life of the transaction. This is typically done to avoid a sudden increase of the OC levels due to downgraded liabilities of the CDO, thus possibly causing a failed OC test to cure.

198. Equity securities received as part of a workout are given no value in the OC tests.

199. We typically look for the method used to assess market value to be standardized, consistent, independent from the collateral manager, and to be a reflection of the market opinion on the value of these obligations. Generally, the meaning of "market value" is derived by applying the following options:

- A price provided by an independent pricing service; or
- The average of three bids from independent broker/dealers; or
- If three bids are not available, the lower of two bids from independent broker/dealers; or
- If two bids are not available, a single independent bid from a broker/dealer.

200. We expect a similar definition of market value to be used consistently for other asset types such as obligations that are deferring, distressed, discounted, current pay, or long dated.

201. If a value cannot be obtained by the collateral manager as described in clauses (a) through (c), the value may be determined by the collateral manager consistent with its standards and certified by the collateral manager to the trustee.

202. Note that while the approach described above is typical for CLOs of broadly syndicated loans, we will evaluate on a case-by-case basis variations tailored for more narrowly constructed pools such as CLOs of mid-market loans.

Debtor-in-possession (DIP) loans

203. Debtor-in-possession (DIP) loans are loans made to bankrupt entities. Generally, in our analysis, we consider DIP loans that are current on their interest and principal payments as performing obligations due to their priority status under the U.S. bankruptcy code. DIP loans with S&P Global Ratings of 'CCC-' or above typically qualify for par treatment in the OC ratio regardless of market value.

Current pay obligations

204. We also recognize an exemption from defaulted obligation treatment for current-pay obligations, which meet the definition of defaulted obligations but have the following characteristics that qualify them for performing obligation treatment:

- For obligors that are not subject to a bankruptcy proceeding, the obligation must be current on all payments that are contractually due according to the underlying documents, including interest and principal payments (note that under our Timeliness of Payments Criteria ("Methodology: Timeliness Of Payments: Grace Periods, Guarantees, And Use Of 'D' And 'SD' Ratings," Oct. 24, 2013) we do not recognize an obligation as current when payments are more than 30 days past due even if the contractual grace period is longer);
- In the reasonable business judgment of the collateral manager, the obligor will continue to remain current on its obligations;
- For obligors that are subject to a bankruptcy proceeding, the bankruptcy court must have issued an order authorizing payments, and the obligation must be current on all such authorized payments; and
- The market value of an obligation should be at least 80% of par, regardless of the asset's rating. We view 80% as the demarcation line for the market's perception of whether an asset is distressed. If the market value of a current-pay obligation falls below 80%, or if no independent mark is available for a current pay asset, the obligation ceases to qualify as a current-pay

obligation and reverts to defaulted obligation treatment.

- The main impact of classifying an asset as a current-pay obligation rather than as a defaulted obligation is the carrying value used to calculate the OC tests. Defaulted securities are carried at the lesser of market value or S&P Global Ratings' recovery value, whereas current-pay obligations may be carried at par. For the purposes of the CDO Evaluator and CDO Monitor, we assume a performing rating input of the higher of its issue rating or 'CCC'. We expect any current-pay obligation with a market value determined by reference to S&P Global Ratings' recovery rate to receive recovery value credit in the calculation of the OC tests.

205. We generally expect current-pay obligations to be limited to a maximum of 10% of the collateral balance. We will treat any current-pay obligations in excess of 10% of the portfolio as defaulted obligations in our analysis. We incorporate current-pay assets in excess of the maximum bucket into our credit analysis using CDO Evaluator (see example in table 24 below).

'CCC' Rated Obligations

206. Because we view obligations rated in the 'CCC' category as having a high risk of further credit deterioration, most transactions include OC test haircuts to the carrying value of 'CCC' rated assets above a predefined threshold. While S&P Global Ratings' CDO Evaluator generally takes into consideration the likelihood of defaults of 'CCC' rated assets based on their historical performance, we believe these assets are more exposed to event risk. Because the historical performance of our rated universe for this rating category may be less predictive, we expect the transaction documents to limit exposure to 'CCC' category obligations.

207. Typically, we expect the 'CCC' bucket to include all obligations rated in the 'CCC' category regardless of their market value, including current-pay obligations (which are assumed to be rated in the 'CCC' category), discount obligations, and DIP loans rated in the 'CCC' category. If the manager applies the CDO Monitor test when purchasing new assets, the CDO Monitor would take into consideration the credit quality of the assets. However, we generally expect the transactions to include haircuts in the coverage tests for 'CCC' rated assets when the exposure to 'CCC' rated assets exceeds 7.5% of the portfolio amount. For transactions where the haircut in the coverage test starts at a higher exposure, we may take into consideration mitigating factors such as modeling the excess exposure in CDO Evaluator at closing.

208. The examples in table 24 below summarize the methods by which we may model excess exposure to current pay and CCC obligations in CDO Evaluator. In accordance with paragraph 205 of these guidance documents, we expect any current pay securities in excess of 10% to be treated as defaulted obligations in the coverage tests. We consider the obligations included in the 10% current pay concentration limit are 'CCC' rated assets in our analysis and we include them in the calculation of the 'CCC' excess described in paragraph 207.

Table 24

Applications Of 'CCC' Assets In CDO Evaluator

	Concentration limitation as % of collateral	Excess carrying value
Example 1:		
Max current pay	10.0%	Carrying value (see paragraph 205)
'CCC' par value haircuts (inc. current pay)	7.5%	Carrying value (see table 23)
Modeling in CDO Evaluator	0%	

Table 24

Applications Of 'CCC' Assets In CDO Evaluator (cont.)

Example 2:		
Max current pay	10%	Carrying value (see paragraph 205)
'CCC' par value haircuts (inc. current pay)	10%	Carrying value (see table 23)
Modeling in CDO Evaluator	2.5% 'CCC'	
Example 3:		
Max current pay	100.0%	Carrying value (see paragraph 205)
'CCC' Par value haircuts (inc. current pay)	7.5%	Carrying value (see table 23)
Modeling in CDO Evaluator	2.5% 'CCC', 90% 'D'	
Example 4:		
Max current pay	10.0%	Carrying value (see paragraph 205)
'CCC' Par value haircuts (including current pay)	100.0%	Carrying value (see table 23)
Modeling in CDO Evaluator	92.5% 'CCC'	

Distressed Exchange Obligations

209. We may treat debt obligations of issuers that have launched distressed exchange offers as current-pay securities rather than defaulted securities, subject to certain conditions. To start, the CDO must already hold the asset and the asset must be current on all principal and interest payments that are due and payable according to the underlying documents. Additionally, if there is an exchange, the offer must be a debt-for-debt exchange, or if it is a cash buyback offer, the debt to be repurchased must be retired. Lastly, the debt issue held by the CDO must have an equal or higher seniority ranking in the capital structure than the issue subject to the distressed exchange or buyback.

210. If all of these conditions are met, the 80% of par market value test may not, as part of our analysis, apply to distressed exchanges on the date of the offer unless the CDO holds debt subordinate to the debt subject to the distressed exchange. Also, if the CDO holds any other current-pay security not subject to a distressed exchange, the 80% of par market value test would still apply to our analysis.

211. For purposes of our analysis, we assume the old debt instrument tendered by the CDO will be carried at the current par value allowed by the CDO documents until the tender or buyback offer is finalized, as there is no certainty the distressed exchange transaction will be completed.

212. Once the tender period is finalized, even before the final ratings are assigned, we assume the old debt instrument will be carried at the new lower par value that the new instrument document promises will be paid for the issue obtained in the exchange. If the offer is for a buyback, we assume the instrument will be held at the net monetary value that will be received from the buyback once the tender offer is completed.

Discount obligations

213. Most transactions permit some portion of collateral pool to be purchased at significant discounts from par. Generally, we view assets purchased below 80% of par as discounted obligations and expect that these assets will be carried at their purchase price. If a transaction permits the purchase of assets at unusually deep discounts from par, we would likely adjust our modeling of the transaction to reflect our view of additional risk.

Long-dated obligations

214. The inclusion of corporate assets that mature on a date beyond the earliest legal final maturity date of the liabilities may require the CDO transaction to sell these assets before their underlying maturity. This exposes the transaction to the noncredit-related risk of loss of par.

215. This concern is addressed primarily by limiting the concentration of assets in the long-dated bucket to a small amount such as 5% of the portfolio amount. When the allowance for this bucket exceeds 5%, we expect the par credit in the OC test numerator for each long-dated asset in excess of 5% to be reduced. The haircut may vary depending on the number of years by which the maturity of the obligations exceed the transaction's legal final. We generally expect to see an OC haircut of at least 10% for each year that the underlying asset maturity exceeds the earliest legal final maturity of the rated notes. Alternatively, we have also seen documentation applying an OC test carrying value of the lesser of current market value and a haircut of 30% of par, which may be adjusted depending on the difference between the underlying maturity date and the transaction's legal final maturity date.

216. To the extent that exposure to long-dated securities exceeds 5%, and the transaction documents do not apply adequate haircuts to the OC test numerator value, we may apply additional adjustments when we analyze the transaction, for example by modeling the potential par loss incurred for the forced sale of the asset under less-than-ideal market conditions.

217. Regardless of the presence of OC test numerator haircuts for long-dated securities, when the transaction exhibits a significant exposure to long-dated assets, for instance in excess of 20% of the performing collateral, we may apply additional stresses such as those indicated in our market value criteria (see "Methodology And Assumptions For Market Value Securities," published Sept. 17, 2013), especially as the number of years remaining until the transaction's legal final maturity decrease.

218. Maturity amendments--Where an asset has become long dated as a result of a maturity amendment that the manager considers was consented to in order to avoid imminent default or to minimize material loss due to materially adverse financial conditions, we generally do not expect these maturity-amended assets to be accounted for in the concentration limitations mentioned above for the purpose of determining the manager's remaining capacity to purchase long-dated assets.

Zero-coupon obligations

219. We expect zero-coupon obligations to be carried at accreted value for OC test purposes.

C. Bivariate Risk (see paragraph 21 of the proposed corporate CDO criteria)

220. Under our CDO criteria, we analyze the credit risk of a portfolio of assets based on the obligor's

credit quality. However, this analysis does not capture situations where the credit risk arises both from the default of the loan or bond's issuer but also from a third party. The section below highlights mitigants we consider to this additional source of credit risk.

221. Transaction structures may include "baskets" for assets with bivariate credit risk, which generally include loan participations, securities lending agreements, and other agreements that may expose the transaction to counterparty risk. The basket limitations are a mitigating factor to the credit risks introduced to the CDO by the counterparties. In a securities lending agreement, for instance, the issuer, as the lender, maybe exposed to the credit risk of the borrower if the borrower defaults and is unable to return the securities borrowed.

222. Bivariate-risk asset baskets are usually limited to 20% of the aggregate pool balance; however, we expect the baskets to be further limited based on the rating of the counterparty, as shown in the table below:

Table 25

Bivariate-Risk Asset Basket Limitations

Counterparty issuer credit rating category	% of asset pool
AAA	20
AA	10
A	5
A-	0

223. The criteria reference long-term ratings on the counterparty when defining the minimum eligible counterparty ratings. Certain counterparties may only have short-term ratings or only reference short-term counterparty ratings in their documentation. In such cases, we would infer a long-term rating from the documented short-term rating. This is the lowest long-term rating that maps to the relevant short-term rating, according to our criteria for linking long- and short-term ratings (see "General Criteria: Methodology For Linking Long-Term and Short-Term Ratings," April 7, 2017).

Participations

224. In a typical loan participation, a participation buyer owns a beneficial interest in the loan, and the participation seller owns the legal interest in the loan and, as such, maintains the servicing responsibilities and the relationship with the borrower. A participation agreement dictates the terms of the participation transfer and the participation buyer's and seller's rights with respect to the loan and its proceeds.

225. Because the participation seller maintains legal title in the participated loan, it is the lender of record and receives loan payments, pursues collections against the borrower, and performs other loan-servicing obligations on behalf of the participation buyer.

226. Consequently, if the participation seller files for bankruptcy, the participation seller's bankruptcy case may delay or otherwise disrupt the participation seller's ability to service the loan and forward loan proceeds to the participation buyer. As such, the participation seller's creditworthiness may generally be a risk to the rated notes. Furthermore, the failure to elevate the participation to an assignment prolongs this risk to the rated notes.

227. When a participation seller is not in our view a bankruptcy-remote entity, in order to conclude that its credit risk to the rated notes is mitigated, we consider whether the transaction's

documentation includes incentives to elevate the participation interest into an assignment. Incentives that we typically observe and view as effective include, but are not limited to, haircuts to the value of the participated collateral generally consistent with the asset carried at recovery value if the necessary consents for the participated loans are not obtained within a reasonable time period, typically by the transaction's effective date.

228. If we determine that a participation seller is a bankruptcy-remote entity, we generally do not consider whether its credit risk is mitigated because we consider that entity's bankruptcy risk to be sufficiently remote.

D. Defining interest and principal proceeds (see paragraph 79 in proposed corporate CDO criteria)

229. Generally, the transaction documents include distinct definitions for interest proceeds and principal proceeds received from the underlying collateral and include provisions governing how each income stream is applied during the CDO's life. We will review these provisions giving particular scrutiny where principal proceeds can be reclassified as interest proceeds and passed down the payment waterfall to equity investors as discussed in the paragraphs below. Such provisions have the effect of increasing the immediate return to equity investors while reducing the credit support available to offset future losses.

230. We generally expect recoveries on defaulted securities to be treated as principal proceeds until the defaulted securities' original par amount is recovered. Accordingly, we expect proceeds from the equity securities held by the issuer and any sub-SPEs to be treated as principal proceeds until the original defaulted securities' full par amounts are recovered in cash.

231. We also expect the entire accreted value of zero-coupon obligations to be paid as principal proceeds when the asset is repaid.

232. A more restrictive definition of what constitutes interest and principal proceeds can provide comfort to debtholders, as anything that is classified as principal will either be used to purchase additional collateral or amortize the secured notes.

233. To the extent that principal proceeds can be recharacterized as interest proceeds, we will review the provisions that allow for par leakage and the presence of mitigating factors in the transaction documents. The paragraphs below highlight the types of recharacterization provisions we commonly see. We analyze other recharacterization provisions from a similar perspective.

234. **Trading gains:** Some documents allow for recharacterization of principal proceeds into interest proceeds when a trading gain has been realized. We expect this to be possible only when the aggregate performing collateral balance (including recoveries) remains above the reinvestment target par balance.

235. **Excess in the ramp-up and/or principal accounts and partial refinancing:** At times, the transaction may reach the effective date target par amount or partly refinance and have cash remaining in the principal account or ramp-up account. Some transaction documents permit the issuer to reclassify such proceeds as interest proceeds and allow the excess par to be released to equity. We expect that this reclassification a) will be restricted to a small percentage of the portfolio; and b) will not result in the performing aggregate collateral balance (including recoveries) falling below the effective date target par amount after giving effect to the distribution. When the issuer provides notice or requests a rating agency confirmation with respect to a partial refinancing, we review the impact of the amendment and related cash flow release to equity to determine the impact on the outstanding ratings. If the transaction documents allow for cash flow

release to equity ahead of the rated notes, we may only give credit up to the target par amount in our surveillance analysis, thereby limiting potential upgrades due to the increase in par.

236. At times, however, the leakage of the excess ramp-up amount may occur on other payment dates following the effective date. Generally, we expect the recharacterization and leakage will be limited to the first or second payment date. We believe that as the time horizon permitting recharacterization increases, the degree of sequence risk to the noteholders increases because the transaction's cushion against defaults or negative credit migration may be eroded. To that end, we may make qualitative adjustments when we see unusually long time horizons during which such leakage can occur.

237. **Amortizing reinvestment par amount:** Some transactions implement an amortizing reinvestment target par amount purportedly to account for the built-in cushion against losses that exists at the closing date. This is a predetermined reducing value of the transaction's target par amount unrelated to whether principal payments are actually made on the notes or not. This is typically used to allow for the recharacterization of principal proceeds as interest proceeds, when the collateral par exceeds these predetermined amounts. We believe that referencing an amortizing reinvestment target par amount would affect the collateral quality tests, the reinvestment criteria, and potentially increase trading gain leakage to the equity holders instead of distributing principal to the notes according to the payment waterfall. Therefore, we believe particular provisions such as these present an enhanced level of risk to the rated notes, and we generally expect they would not apply, unless other mitigating factors are in place to limit this risk.

238. **Exercising warrants:** A warrant is an option that entitles the holder to buy the underlying stock of the issuing company at the exercise price until the expiry date. Generally, we see CDOs receiving such options through the workout of a distressed obligation. We typically see warrants exercised only with interest proceeds. However, some transactions permit principal proceeds to be used. When principal proceeds may be used to exercise a warrant, we expect the performing aggregate collateral balance (including recoveries) to remain above the reinvestment target par after giving effect to the exercise of the warrant. We also expect the sale proceeds from the equity securities acquired via the warrants to be considered principal proceeds.

E. Note Redemption, Amendments, Refinancing, And Repricing (see paragraph 86 of the proposed corporate CDO criteria)

Indenture amendments and related consents

239. Transaction terms in a CDO indenture can typically be amended at any time by entering into a supplemental indenture, subject to certain conditions. Some amendments do not require noteholder consent if they do not materially and adversely affect any noteholder. These may include implementing name changes, clarifying language, conforming to changes in law, or modifying terms to conform with rating agency methodologies.

240. Other types of amendments may require some form of consent from each noteholder who would be materially affected by the proposed changes. These may include amending the stated maturity, interest rate, or principal amount of the notes, the payment priority, or certain definitions that affect noteholder consent. Depending on the transaction, the process to execute a supplemental indenture that requires noteholder consent varies. Generally, trustees and collateral managers track down the noteholders and obtain their consent to make a change; if they can't reach all noteholders deemed materially affected, they can't implement the change. However, in some

cases the transaction documents include "deemed consent" or "negative consent" provisions, which allow the trustee and collateral managers to assume noteholder consent if they send out a notice of change and don't receive a formal objection within a predetermined period.

241. S&P Global Ratings expects to receive notice of all amendments prior to and upon their execution. We will review the amendments and determine whether they have an impact on the rating of the notes. If we determine the amendment gives us cause to take a rating action on publicly rated notes, we will publish the rating action and our rationale. As S&P Global Ratings is not a party to the transaction, we generally do not comment on the requirement or process of obtaining noteholders' consent. However, note that:

- We view some changes, such as entering into a hedge agreement, as having a greater likelihood of impacting the ratings than others;
- We have seen some document provisions giving the collateral manager the ability to make certain changes without an amendment. We would likely review such changes on a case-by-case basis; and
- As a general matter, we expect to receive notice of any changes to the transaction documents.

Redemption provisions

242. The transaction documents of most CDO transactions contain provisions allowing for early redemption, refinancing, or repricing of the rated liabilities. The underlying principle of our rating methodology is to address whether the holders of the rated notes receive timely and ultimate payment of interest and principal on the rated notes.

243. We look for redemption, refinancing, and repricing provisions to be consistent with our view of payment to the rated notes. Our analysis would typically take into account how the rights of the holders of the rated notes to receive payment in full may be affected by such provisions.

Optional redemption of rated notes

244. Most CDO transaction documents contain provisions that permit the holders of the equity or the subordinated notes to call the notes in whole after a certain date (usually after the non-call period as defined in the documents). The redemption price includes all interest accrued to the redemption date and full payment of the outstanding principal amount. We generally view this type of redemption provision as ratings-neutral since the holders of the rated notes would be repaid in full.

245. To the extent that optional redemption provisions permit holders of the rated notes to receive less than the full principal amount, or physical delivery of the collateral, we expect 100% consent of the noteholders to be required.

Refinancing of the rated notes

246. Many CDO transaction documents include provisions for the refinancing of the rated notes. We view refinancing of all the rated notes as analogous to an optional redemption because the holders of the existing rated notes would be paid full principal and accrued interest from the proceeds of the newly issued refinancing notes.

247. We typically expect certain conditions to be met in connection with refinancings. Examples of such conditions include, but are not limited to:

- Notice to S&P Global Ratings is provided in advance of such refinancing;
- Refinancing proceeds along with other available funds are sufficient to pay the full outstanding principal amount and accrued interest on the existing notes;
- The principal amount of the refinancing notes is equal to the principal amount outstanding of the existing notes on a class-by-class basis;
- The maturity date of the refinancing notes is no earlier than that of the existing notes;
- The interest rate of the refinancing notes does not exceed the interest rate of the existing notes; and
- The refinancing notes are paid at the same priority level as the existing notes.

248. Variations on the concept of refinancing that do not refinance all of the rated notes may have a ratings impact. We typically evaluate, on a case-by-case basis, the impact on the creditworthiness of the nonrefinanced notes. To the extent this potential impact cannot be fully evaluated at closing, we would likely highlight any material risk we believe such provisions may present.

Repricing of the rated notes

249. Some CDO transaction documents include provisions for the repricing of the rated notes. We view repricing as potentially having a ratings impact due to the change in cash flow requirements repricing would entail. For repricings, we typically need to review the transaction to determine if a rating action is warranted.

250. In our analysis, we typically pay special attention to the treatment of noteholders that do not consent to the repricing. Generally, we expect nonconsenting noteholders to be redeemed in full. To the extent nonconsenting holders' notes are not redeemed in full, or where consent is deemed from nonresponsive noteholders, we will evaluate such provisions on a case-by-case basis. We would likely highlight any material risk we believe such provisions may present.

F. Additional issuances and note cancellations

Additional note issuance (see Structured Finance: Asset Isolation And Special-Purpose Entity Methodology," published March 29, 2017)

251. Most CDO transaction documents allow for the issuance of additional notes subordinate in right of payment to the rated notes. Generally, we view such issuance as ratings-neutral.

252. To the extent that an additional issuance of notes is not subordinate to the rated notes, we evaluate the impact on the rated notes. At a minimum, we expect to receive notice of such additional issuance. (Note that our issue ratings are CUSIP/ISIN-specific.) We generally expect to see the following conditions met before issuance of additional notes:

- Identical terms to the existing class of notes;
- Same or lower spread or interest rate as the existing class of notes;
- Pro rata issuance unless the additional notes are junior in right of payment;
- Same maturity;
- Issuance may take place only during reinvestment period;

- Proceeds from additional issuance will be applied to the purchase of additional collateral; and
- Maintain or improve OC ratios after giving effect to the additional issuance.

Note cancellation without payment (see paragraph 79 of the proposed corporate CDO criteria)

253. Occasionally, CDO transaction documents permit cancellation of debt without payment. Cancellation of debt below the most senior tranche affects the payment structure and cash flow mechanics, as well as the level of credit support, in CDO transactions that contain coverage tests (O/C tests and/or interest coverage (I/C) tests) in their payment waterfall. Generally, the cancellation of subordinate debt without payment according to the payment waterfall makes the coverage tests below the most senior test less sensitive to failing due to defaults or decline in the credit quality of the collateral portfolio. When the subordinate coverage tests are less likely to fail, the senior-most notes in transactions with sequential payment priority are less likely to receive principal payments resulting from diversion of interest and/or principal proceeds to cure the test, even though the quality and par amount of the asset pool has not changed.

254. If the transaction documents permit cancellation without payment, our criteria look for the cancelled debt to be counted as outstanding for purposes of calculating the coverage tests. This treatment applies to all debt junior to the senior-most notes.

255. If presented with transaction documents that do not prohibit note cancellation without payment or do not count the cancelled debt as outstanding in calculation of the coverage tests, we may apply stresses in our rating analysis that do not give credit to the junior coverage tests.

G. Note events of default (see Methodology: Criteria For Global Structured Finance Transactions Subject To A Change In Payment Priorities Or Sale Of Collateral Upon A Nonmonetary EOD," published March 2, 2015)

The use of rating-based haircuts in event of default overcollateralization

256. According to our criteria, we typically seek to assess whether the likelihood that an event of default (EOD) occurs is commensurate with a given rating scenario. Certain CDO transactions include the breach of coverage tests as an event of default under the terms of the notes. When this happens, we look for specific elements described below, to enable us to assess whether the likelihood the event occurs is commensurate with a rating scenario.

257. A rating-based adjustment of the value of an asset in a CDO--generally to less than its par value--may occur if the asset is downgraded to a specific, predetermined rating level or if certain rating concentrations in the transaction begin to exceed preset amounts. Revaluing assets at less than par causes the OC ratio to drop, which in turn may cause the transaction to fail its EOD OC ratio test.

258. A breach of an EOD OC ratio test often gives the controlling noteholders in a CDO the right to accelerate repayment of the notes. The acceleration of a transaction typically halts interest and principal payments to all but the most senior notes until the senior classes are paid in full. Essentially, the transaction returns to a true sequential waterfall payment structure, in which the notes in the transaction are repaid interest and principal in order of priority.

259. A breach of an EOD OC ratio test also typically gives the controlling class of noteholders additional

rights, including the sole right to liquidate all of the CDO's collateral. Generally, when transactions are liquidated at the direction of the controlling class, they face market value risk that significantly increases the likelihood that all but the most senior noteholders will suffer losses.

260. Given the potential impact of EOD OC ratio-driven defaults, we will generally rate CDO transactions that have EOD OC ratio tests only if the tests include the following as described in paragraphs 261-264.

261. S&P Global Ratings expects the EOD OC ratio test haircuts will be limited to those for defaulted securities and equity securities. For this purpose, we generally expect defaulted securities to include securities or obligors with a rating of 'CC,' 'D', or 'SD' only, or to be otherwise consistent with our definition of a defaulted obligation. We also expect defaulted securities in the EOD OC ratio test to be carried at their then-current market value.

262. We will assess, in our cash flow analysis, whether the likelihood that this EOD OC test is triggered is commensurate with the rating scenario considered for each class of notes. In this case, the controlling class may decide to accelerate note repayment and/or liquidate the assets. We typically see the EOD OC ratio threshold set at 102.5% or less. To the extent the threshold is set higher (i.e., it is more sensitive to failure), we would likely evaluate the potential impact on the rated notes absent other mitigating factors.

263. We review any additional haircuts to EOD OC ratio tests that may be included in future transactions to determine whether the haircut is commensurate with the assigned rating.

264. We apply a higher level of scrutiny where we rate a junior 'AAA' class and the senior 'AAA' class has the right to liquidate the transaction based on the EOD OC test failure.

H. Variable Funding Notes (see counterparty criteria "Nonderivative Counterparties" section)

265. Variable-funding notes (VFNs) are issued in certain CDO transactions to counter so-called negative carry arising when the issuer invests some of its note proceeds in revolving or "delayed-draw" loans. These VFNs are typically issued as the most senior class of notes in a sequential pay senior/subordinated capital structure.

266. The risk with such structures arises if the VFN investor is unable to fund the VFN when the borrower in the loan requests a draw.

267. This inability to fund could lead borrowers to have a claim against the SPE or potentially to petition the SPE into bankruptcy. As such, the exposure to the VFN investor constitutes counterparty risk.

268. The remoteness of this actually happening lessens lender liability, as a series of events need to occur:

- First, the VFN investor must be unable to fund.
- Then, the CDO collateral manager must be unable to access cash from other sources (for example, cash in the transaction or cash from the sale of assets).
- Next, the borrower must be unable to find alternative sources of funding for his borrowing needs.
- Finally, the borrower must consider that commencing an action against, or petitioning, the SPE is in his best interest despite the uncertainty and significant time delay involved.

269. However, the consequences to the CDO vehicle of the VFN failing to pay could be very material to the rating, in case borrowers petition the SPE into bankruptcy.

270. Therefore, consistent with our counterparty criteria, we treat this nonderivative exposure as limited. Hence the minimum eligible rating on the VFN investor to support a 'AAA' rating on the VFN would be 'A'--or 'A-1' where it has only a short-term rating. Upon the loss of that minimum eligible rating, we expect the transaction documents to include a commitment by the VFN provider to, within 90 days, replace itself, provide a guarantee from an entity carrying the minimum eligible rating, or fund its entire outstanding commitment amount.

271. As with institutional investors, when the holder of the VFN is an ABCP conduit or other structured finance entity with limited sources of liquidity (a "structured conduit investor"), our criteria look to the same minimum eligible rating and downgrade remedies.

272. However, unlike with institutional investors, a key consideration is the ability of the structured conduit investor, as VFN holder, to fund draws upon request, which generally depends on its ability to successfully sell additional commercial paper or otherwise access its sources of liquidity.

273. Structured conduit investors will frequently be supported by an external liquidity facility. However, these facilities are typically only designed for the benefit of the rated investors in the structured conduit investor, not for general creditors of the structured conduit investor, as the CDO issuer would be. In addition, typically, all of the structured credit investor's assets are pledged for the benefit of its rated investors. Accordingly, the structured conduit investor may not have a direct source of liquidity to support the funding requirements under the VFN. To purchase a VFN, a structured conduit investor must ensure that a sufficient source of liquidity is available for the benefit of the CDO issuer.

274. We therefore look for a minimum eligible rating of 'A' (or 'A-1') on the liquidity facility supporting an Asset-backed commercial paper VFN investor, to allow for 'AAA' rated VFN notes.

I. Subsidiary special-purpose entities (see Structured Finance: Asset Isolation And Special-Purpose Entity Methodology," published March 29, 2017)

275. CDO documentation and amendment requests strive to permit CDOs to establish subsidiary SPEs (sub-SPEs) to hold equity securities received as part of a workout or distressed exchange of an underlying defaulted or distressed asset.

276. Our analysis of these sub-SPEs is an application of our published criteria for rating bankruptcy-remote SPEs.

277. The criteria seek to limit the impact of sub-SPEs incurring expenses in excess of any cash flows generated by their underlying assets. We believe the CDO's cash flows are the only source of cash to pay these expenses. To limit any potential cash outflows that might take priority over payments to the rated notes of the CDO, the criteria look for all of the sub-SPEs' expenses to be subject to the administrative expense cap typically found in the CDO's payment waterfall. These expenses include the cost of establishing the sub-SPEs and any ongoing expenses and taxes incurred that are not covered by the cash flows from the sub-SPEs' underlying assets.

278. We believe a CDO could face potential liquidity risks and exposure to third-party liability as a result of the ownership of real property obtained through foreclosure. We view exposure to real property risks and to loans secured primarily by real estate as not appropriate for inclusion in CDOs of corporate debt. Because of this, we would look for express document provisions prohibiting CDO issuers, as well as sub-SPEs, from obtaining title to real property or from obtaining a controlling interest in an entity that owns real property.

279. We do not give any credit to equity securities when we perform our cash flow analysis. We also do

not include equity securities when calculating the cash flow CDO's coverage tests. Most CDO transaction documents specify that equity securities are carried at zero in the OC tests. We believe that the equity securities held by the sub-SPEs should also be carried at zero both in our cash flow analysis and when calculating the CDO's OC tests.

280. Our criteria look for any cash received from the disposition of the equity securities held by the sub-SPEs to benefit the CDO by flowing through the payment priority. We believe these proceeds should be treated in the same manner as recoveries on defaulted securities. Under our criteria, recoveries on defaulted securities are treated as principal proceeds until the defaulted securities' full original par amounts are recovered. Accordingly, the criteria consider proceeds from the equity securities held by sub-SPEs to be treated as principal proceeds until the original defaulted securities' full par amounts are recovered in cash.

281. The criteria look for any assets held by the sub-SPEs to be liquidated on or before the CDO's legal final maturity date and paid out to the CDO's investors according to the final payment waterfall in the transaction documents.

J. Combination notes (see paragraph 57 and 87 in the proposed corporate CDO criteria)

282. A combination note is a security that is generally structured by combining two or more different tranches issued by a CDO transaction. It could also be structured by combining one or more rated tranches with equity in a CDO transaction (CDO equity).

283. When a combination note is rated at the time of the transaction's origination, the notional balance of combination notes is often equal to the aggregate of the components, but it may also be higher or lower, depending on the allocation of payment proceeds from the components to the combination notes. For combination notes without a stated coupon, we rate to principal only, as indicated by a 'p' subscript. For our rating purposes in such circumstances, the issued amount outstanding of the combination notes will decline after taking into account paydowns on account of interest distributions, equity distributions, and principal distributions on the underlying components.

284. It is also possible that the notional balance for the combination note may be less than the sum of the principal balance remaining on each of the combination note components. This could happen generally because of the following instances:

- Where the stated interest on the combination notes is lower than the stated interest on the rated note components and where the differential in interest received from the underlying component is applied toward the reduction in the balance of the combination notes.
- Where a CDO equity tranche is one of the components of the combination notes and where the appropriate portion of the equity distribution that goes toward the combination note reduces the outstanding par amount of the combination notes.

285. It is therefore possible that investors in combination notes can potentially be paid out their entire balance while the components still remain outstanding. A likely concern for investors in such a scenario is that their ability to benefit from subsequent residual payments from equity may be capped or limited.

286. To mitigate this risk, underlying documents have often required the notes to be written down when any distributions that were relied upon under the rating scenario are made, but may also allow a nominal amount of the combination notes (usually $1) to remain outstanding until the maturity of the transaction. In doing so, any additional distributions that were not expected under the

stressed rating scenario can be paid to the combination noteholders as residual upside.

Optional redemptions when combination notes include equity securities

287. Cash flow CDO transactions may have provisions that allow the CDO, after a specified non-call period, to call the transaction as long as the rated notes can be redeemed in full. However, for those combination notes that are a combination of rated notes and equity notes, there is no guarantee they will be redeemed for par because the underlying documents do not require equity securities to be repaid in full for an optional redemption to occur. Often, in our cash flow analysis, the combination note rating analysis may rely upon many years of cash flow from its constituent parts and, therefore, if the transaction is called early this might mean that not all of the initial investment is received. The redemption price of the subordinated notes may not compensate for the loss of future cash flows.

288. S&P Global Ratings will rate combination securities comprising CDO equity, as long as the combination noteholders are redeemed at par plus accrued interest upon an optional redemption. In application of the criteria, a distribution of the underlying components to the holders is consistent with our approach, and we would withdraw the rating on the combination notes upon such distribution. Full repayment of interest and principal may not be a condition for an optional redemption if the combination noteholders vote in favor of an optional redemption as a separate class from the CDO equity holders.

Cash flow assumptions when combination notes include equity securities

289. When combination notes include components of CDO equity, S&P Global Ratings needs to be able to assess in its cash flow analysis all payments that must be made in the payment waterfall before the equity payments are disbursed. These payments include any fees, expenses, or other disbursements that do not have a stated amount or rate. Examples include uncapped administrative fees and expenses, hedge termination payments, and subordinate, deferred, and incentive management fees.

290. Hedge termination payments are generally difficult to quantify, given that such payment is a function of the interest rate environment, the strike rates, or the notional amount in the contract. Given the uncertainty around such payments, S&P Global Ratings will assign a rating to the combination notes that is the lower of the rating on the derivative counterparties and the rating commensurate with the cash flow results.

291. To address the uncertainty about uncapped administrative expenses, S&P Global Ratings will use multiples of the administrative expenses capped at the top of the waterfall to stress payments available for equity when assessing cash flow for our rating analysis for combination notes. We assess other expenses such as subordinated, deferred, and incentive management fees based on the caps included in the documentation.

292. **Refinancing of the underlying combination securities.** Transactions may include the option to refinance one or more classes of notes at a lower coupon than at issuance. Generally, when classes of notes are refinanced or repriced, the debt is paid off in full at its applicable redemption price. If the offer is accepted by the respective noteholders, their redemption proceeds will be invested into the newly issued note.

293. In a combination note, the refinancing of one or more of the underlying components can change the coupon on the combination note. If we relied on portions of the underlying components' coupons in our cash flow analysis, a decline in the coupons could cause a weakening in the combination note's credit quality. Due to the potential impact on the credit quality of the

combination note, we expect that the change in coupon would be voted on and accepted by 100% of the combination noteholders (voting separately from the underlying noteholders). Should the combination noteholders decline to lower the coupon they receive on the underlying note, we expect the combination note to be unwound and the noteholders to be delivered the respective components. If S&P Global Ratings still has a rating outstanding on the combination notes at the time of the refinancing and the underlying components contain subordinated notes, we expect that the combination noteholders would also have the voting right to decide how they receive the equivalent of their subordinated component.

294. **"Principal-protected" combination securities.** These are securities that are usually backed by CDO notes or certificates issued by a CDO and another type of security. These securities are typically federal, state, or local government-issued bonds, notes, or strips. Due to this feature, the rating assigned to these principal-protected combination notes is typically linked to the rating on the issuer of the supporting security. In order to rate principal-protected combination securities, we expect them to include the following conditions:

- The underlying security matures on or before the legal final maturity date of the combination notes;
- The underlying security has a stated principal amount at maturity that is at least equal to the balance of the combination note that it supports;
- The underlying security is denominated in the same currency as the combination notes, unless the currency risk is otherwise mitigated;
- The supporting security is held as collateral in the CDO transaction until its legal final maturity. If it sold, the proceeds from the sale or liquidation of the supporting security are sufficient to repay the principal due and accrued interest on the combo notes and are first used to pay the amounts due on the combination notes in full, before being used otherwise; and
- In certain transactions, the combination noteholders may also elect to receive the supporting security in full satisfaction of the balance of the combination note (physical delivery). When physical delivery is elected, we expect that no additional costs to physically acquire the assets should need to be covered by the noteholders.

295. This appendix provides additional information and guidance to these proposed criteria, and we expect to publish this information and guidance in a separate guidance document following the publication of the finalized criteria article. It is intended to be read in conjunction with the proposed criteria herein and aforementioned cash-flow criteria. Guidance documents are not criteria, as they do not establish a methodological framework for determining credit ratings. Guidance documents provide guidance on various matters, including articulating how we may apply specific aspects of criteria; describing variables or considerations related to criteria that may change over time; providing additional information on non-fundamental factors that our analysts may consider in the application of criteria; and providing additional guidance on the exercise of analytical judgment under our criteria. Our analysts consider guidance documents as they apply criteria and exercise analytical judgment in the analysis and determination of credit ratings. However, in applying criteria and the exercise of analytic judgment to a specific issuer or issue, analysts may determine that it is suitable to follow an approach that differs from one described in the guidance document. Where appropriate, the rating rationale will highlight that a different approach was taken. For more information about guidance documents please see "Criteria And Guidance: Understanding The Difference" in Related Research below.

RELATED CRITERIA AND RESEARCH

Retired/Superseded Criteria

If implemented as proposed, these criteria would supersede the following criteria articles:

- Global Methodologies And Assumptions For Corporate Cash Flow and Synthetic CDOs, Aug. 8, 2016
- Revised CDO Current-Pay Criteria Assumptions For Corporate Debt When Issuer Announce A Distressed Exchange Or Buyback, May 18, 2009
- The Use of Ratings-Based Haircuts In Event Of Default Overcollateralization Tests For CDOs, March 19, 2008
- Qualification And Treatment Of Current-Pay Obligations In Global Cash Flow CLOs, July 11, 2007
- CDOs: CDO Spotlight: 'A-1' Short-Term Rating Required for Investors in CDO Variable Funding Notes, May 24, 2004

Related Criteria

- Counterparty Risk Framework: Methodology And Assumptions, March 8, 2019
- Structured Finance: Asset Isolation And Special-Purpose Entity Methodology, March 29, 2017
- Recovery Rating Criteria For Speculative-Grade Corporate Issuers, Dec. 7, 2016
- Guarantee Criteria, Oct. 21, 2016
- Methodology: Jurisdiction Ranking Assessments, Jan. 20, 2016
- Methodology: Criteria For Global Structured Finance Transactions Subject To A Change In Payment Priorities Or Sale Of Collateral Upon A Nonmonetary EOD, March 2, 2015
- Principles For Rating Debt Based On Imputed Promises, Dec. 19, 2014
- Global Investment Criteria For Temporary Investments In Transaction Accounts, May 31, 2012
- Principles Of Credit Ratings, Feb. 16, 2011
- Methodology: Credit Stability Criteria, May 3, 2010
- Understanding S&P Global Rating's Rating Definitions, June 3, 2009

Related Research

- Credit FAQ: Understanding S&P Global Ratings' Request For Comment On Proposed Changes To Its CLO And Corporate CDO Criteria, April 10, 2019
- Criteria And Guidance: Understanding The Difference, Dec. 15, 2017
- Jurisdiction Ranking Assessments Of National Insolvency Regimes Update: November 2017, Nov. 22, 2017

The proposed criteria represent the specific application of fundamental principles that define credit risk and ratings opinions. Once proposed criteria become final, their use is determined by issuer- or issue-specific attributes as well as our assessment of the credit and, if applicable, structural risks for a given issuer or issue rating. Methodology and assumptions may change from time to time as a result of market and economic conditions, issuer- or issue-specific factors, or new empirical evidence that would affect our credit judgment.

This report does not constitute a rating action.

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