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Update To Global Methodologies And Assumptions For Corporate Cash Flow And Synthetic CDOs

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Update To Global Methodologies And Assumptions For Corporate Cash Flow And Synthetic CDOs

(Editor's note: This criteria article originally was published on Sept. 17, 2009. It is being updated to reflect changes in our CDO country groupings for recovery (table 11) and additional information being taken into account for purposes of assigning recovery rates to assets (paragraphs 97 and 103, along with table 12). The analytical contact names have also been updated. References in the article to a "Request For Comment" (RFC) refer to the RFC that preceded the previous update in 2009.

This criteria article amends and supersedes parts of our methodology and assumptions for rating corporate CDOs in the articles highlighted in paragraph 7, and fully supersedes the article titled "Methodology And Assumptions: Default And Correlation Parameters For Sovereign Debt Assets In CDOs," published March 13, 2012.)

1. Standard & Poor's Ratings Services is updating its methodologies and assumptions for rating corporate cash flow and synthetic collateralized debt obligations (CDOs). This update follows our request for comment (RFC), titled "Update To Global Methodologies And Assumptions For Corporate Cash Flow CDO And Synthetic CDO Ratings," published March 18, 2009. This represents a significant recalibration of our CDO criteria and is intended to enhance the comparability of CDO ratings with ratings in other sectors, such as corporates, municipals, sovereigns, and other areas of structured finance (see "Understanding Standard & Poor's Rating Definitions," published June 3, 2009).

2. This criteria update addresses the "credit quality of the securitized assets" principle as described in "Principles Of Credit Ratings," published Feb. 16, 2011.

SCOPE OF THE CRITERIA

3. This article is for cash flow CDOs backed by corporate debt (loans and bonds) and for synthetic CDOs that reference 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 CDOs of corporate CDOs, CDOs of hybrid trust preferred securities (TruPS), and CDOs backed by sovereign securities. For ease of reference, we refer to these cash flow and synthetic CDO transactions as "corporate CDOs."

4. These criteria do not cover CDOs of structured finance securities, CDOs of mixed pools of corporate and structured finance securities that have very small concentrations of corporate debt, CDOs of municipal debt, market value CDOs, and operating companies.

5. These criteria apply to all new and existing corporate CDO transactions that contain well-diversified pools of corporate credits and have fairly uniform exposure to all the credits. Exposure refers to a number of parameters affecting the potential performance of the asset portfolio, including asset size, rating distribution, spread/premium distribution, and recovery prospects. These criteria also apply on an interim basis to step-up or step-down

transactions, long/short transactions, forwards-start transactions, and leveraged super-senior transactions without spread tests. For transactions with long/short credit positions, the credit we give to the shorts is limited as per the methodology we used before this criteria update.

6. We believe that, in most cases, these criteria address the objectives discussed in paragraph 10. However, particular transactions may call for additional types of stress testing and analysis. Examples of such transactions include small-basket trades, leveraged super-senior transactions with spread tests, and novel or unusual transactions that contain concentrated or "bar-belled" asset portfolios. For these types of transactions, these criteria are not yet applicable. In the future, we may apply these criteria as a starting point for our analysis and will likely make specific modifications or apply additional stresses according to our evaluation of the structure and the associated credit risks.

SUMMARY OF 2009 CRITERIA UPDATE

7. This article amends and supersedes parts of our methodology and assumptions for rating corporate CDOs in the following articles:

- Global Methodology For Rating Trust Preferred/Hybrid Securities Revised, published Nov. 21, 2008, and
- Criteria For Rating Synthetic CDO Transactions, published in September 2003.

8. This report changes our prior analytical framework for corporate CDOs. We received many comments from different investors, CDO arrangers, CDO collateral managers, as well as other interested parties in response to our RFC. Based on those comments, we have made some modifications to the proposal in the RFC; however, we are adopting most of the elements proposed.

9. Notwithstanding these significant revisions to the criteria, our primary focus was 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.

10. We believe that adding quantitative and qualitative elements to the analysis—entirely apart from the Monte Carlo default simulations run in Standard & Poor's CDO Evaluator—will provide a more robust analysis than using only simulation models. We also believe that by recalibrating CDO Evaluator to specific "targeted portfolio default rates," we have made it easier and more transparent for investors to understand our ratings and analysis and to relate them to their investment objectives.

11. In summary, the updated criteria:

- Introduce additional quantitative and qualitative tests, including certain stress tests, concentration limits, and minimum capital (equity) levels;
- Recalibrate the CDO Evaluator default model to targeted 'AAA' default rates that we consider are commensurate with conditions of extreme macroeconomic stress, such as, for example, the Great Depression (see "Understanding Standard & Poor's Rating Definitions");
- Recalibrate our CDO Evaluator model to targeted corporate 'BBB' default rates consistent with the highest actual corporate defaults that have occurred over the past 28 years, as recorded in our CreditPro database (which tracks our outstanding ratings and their history);

- Introduce tiering of recoveries for synthetic CDOs;
- Reduce the expected level of recoveries based on the expected stress levels for CDO tranches, commensurate with their ratings;
- Update some of our cash flow stress parameters, such as the starting time of defaults and tranche break-even default rate analysis;
- Incorporate credit stability as a consideration in our CDO analysis; and
- Incorporate sensitivity to modeling parameters as a consideration in our CDO analysis.

12. With this update, we believe the most notable change is the addition of the qualitative and quantitative tests for each rated tranche. The goals of these tests are to address both event risk and model risk. Because these tests augment the default simulations we conduct in CDO Evaluator, we refer to them as "supplemental tests." In considering a proposed rating for a particular tranche, we look to see whether it passes (i) all applicable supplemental tests, (ii) the standard CDO Evaluator tests, and, if applicable, (iii) the cash flow stresses. Any of these three analyses may constrain the tranche's rating.

13. Additionally, the updated criteria include a recalibration of our CDO Evaluator model to specific targeted stressed default scenarios at each of our rating categories. The updated criteria include adjustments to the asset default rates, correlation, and other model parameters to produce asset portfolio default results for 'AAA' rated CDO tranches that reflect conditions that we consider to be of extreme stress, such as, for example, the Great Depression. Like other securities in the 'AAA' rating category, we believe 'AAA' rated corporate CDO tranches should be able to withstand extreme macroeconomic stress without defaulting.

14. Finally, the updated criteria include a scenario analysis to test what effects changes in key portfolio parameters (correlation, recovery, spreads, and default bias) would have on tranche ratings. This aspect of the criteria is intended to further address the issue of credit stability (see "General Criteria: Standard & Poor's To Explicitly Recognize Credit Stability As An Important Rating Factor," published Oct. 15, 2008) by identifying CDO tranches that exhibit a greater-than-expected effect from parameters other than asset defaults.

Difference Between 2009 Update And Request For Comment

15. This article includes several key changes from what we proposed in the March 18, 2009 RFC. These changes incorporate both feedback from the comments we received and further refinements to our methodologies and assumptions. The key changes include:

- Modifying the "largest obligor default" supplemental test (referred to as the "minimum obligor test" in the RFC) to factor in the credit quality of the underlying assets and assume a stressed 5% recovery;
- Assuming a recovery rate of 17% in the "largest industry default" supplemental test;
- Adding an "alternative largest industry default test" that looks at the diversification within each industry if the first "largest industry default" supplemental test does not pass;
- Adjusting the targeted portfolio default rates slightly downward relative to the RFC for 'BBB' rated assets under the 'AAA' CDO tranche rating stress;
- Maintaining our previous assumption of a negative one-notch rating adjustment for assets on CreditWatch negative instead of increasing it to a two-notch adjustment;

- Assuming lower recoveries for bonds and subordinated loans;
- Assuming lower recoveries for assets with recovery ratings;
- Modifying our break-even cash flow results analysis to capture more of the tail of the results distribution;
- Increasing the correlation between corporate assets and corporate CDO tranches held as assets in the CDO transaction;
- Increasing the correlation between corporate CDO tranches and other corporate CDO tranches held as assets in the CDO transaction;
- Applying the supplemental tests to each inner CDO of a CDO-squared transaction; and
- Capping the rated note issuance amount to the economic value retained in the transaction.

IMPACT OF 2014 CHANGES ON OUTSTANDING RATINGS

16. Generally, we do not expect any impact on the ratings of our existing CLO transactions. Some transactions may see a change to the amount of cushion available to support their current ratings, as follows:

17. Existing CLO transactions still within their reinvestment period may see moderately increased cushion between the break-even default rates and scenario default rates, especially at the more senior tranches, but we don't anticipate upgrades. When reviewing ratings assigned to CLO transactions still within their reinvestment period, our surveillance committees generally assess cash flow runs generated at covenanted minimums when evaluating potential upgrades above the original rating on a CLO tranche. Managers that amend or update their transaction documents to incorporate the new recovery information into their calculation of weighted average recovery rate may potentially see a modest increase in their CDO Monitor Test cushion.

18. CLO transactions that are past their reinvestment may see increased cushion between the break-even default rates (BDR) and scenario default rates, especially at the more senior tranches. When deciding whether to upgrade ratings on CLO transactions that have completed their reinvestment period, surveillance committees generally assess cash flow analysis generated at actual portfolio values, rather than minimum covenanted values. To the extent a particular CLO has a larger weighted exposure to loans in the upper portion of the range for recovery rating categories '2' through '5', the recovery assumption we use in our cash flow analysis will likely increase. However, we generally expect that changes to ratings on these CLOs will tend to be driven more by paydowns to senior classes of notes, rather than changes in recovery rates.

EFFECTIVE DATE AND TRANSITION

19. These criteria are effective immediately for all new and outstanding corporate CDO transactions.

METHODOLOGY AND ASSUMPTIONS

New Supplemental Stress Tests

20. The new criteria include supplemental tests intended to address both event risk and model risk that may be present in rated transactions.

21. The first test is a "largest obligor default test." This test assesses whether a CDO tranche has sufficient credit enhancement (not counting excess spread) to withstand specified combinations of underlying asset defaults based on the ratings on the underlying assets, with a flat recovery of 5%. For sovereign assets, the recovery rate used to calculate the largest obligor default test is 25%.

22. The second test is a "largest industry default test." 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', and 'AA-' has sufficient credit enhancement (not counting excess spread) to withstand the default of all obligors in the transaction's largest industry, with a flat recovery of 17%, 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.

Applicability of the supplemental tests

23. 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 tests.

24. Exceptional circumstances may warrant an adjustment of these supplemental tests. As explained in paragraph 37, it is possible that small CDO tranche balances and expected tranche amortization profiles may render these tests analytically inapplicable or call for the use of alternative supplemental tests. For these tests we use the same obligor ratings that we use in CDO Evaluator. For ease of implementation and transparency, we have programmed these tests into CDO Evaluator. The tests are separate and distinct from the Monte Carlo simulation of defaults, and as such we refer to them as supplemental tests.

Largest obligor default test

25. The RFC proposed that the criteria would include testing whether rated tranches would be able to withstand the defaults of a minimum number of the largest credit or obligor exposures within the asset pool, assuming no recoveries. We proposed a straightforward test where a 'AAA' tranche should have withstood the default of the 10 largest assets in the pool, a 'AA' tranche should have withstood the default of the eight largest assets in the pool, etc.

26. Comments on the proposed test included that it did not reflect the credit quality of specific assets and that assuming zero recoveries was too onerous.

27. Based partly on these comments, the largest obligor default test in the final criteria factors in the credit quality of the underlying assets (see table 1), and assumes a stressed flat 5% recovery rate for all defaults. Both the ratings on the obligors in the asset pool and the rating on the CDO tranche drive this test.

Table 1

Largest Obligor Default Test

Event risk test: Survive a number of defaults with 5% recoveries

	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-'.

28. For example, under our criteria 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, 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-'.

29. We apply this test by taking the par balance of the performing asset pool, plus the principal cash balance in the transaction, minus the highest of the losses from the largest obligor default test, plus expected recoveries on assets that are currently in default and are being held in the asset pool. We then compare this amount with the CDO tranche balances rated pari passu or senior to the given rating at which we apply this test. This is similar to an adjusted overcollateralization test. We deem the test to have passed if the adjusted par value of the assets is greater than the principal balance of the liabilities rated at or above the given rating level.

30. For synthetic CDOs we consider whether the attachment point is set sufficiently high to allow the highest losses from the obligor test without breaching the rated tranche's loss attachment point.

31. For this test, the criteria deem all assets rated below 'CCC-', and still included in the CDO asset pool, to be defaulted. Also, under these criteria the value we assume for defaulted cash assets already held by the CDO is the lower of the recovery value shown in table 10, or in table 12 if the assets have a recovery rating, or the current market value. For defaulted synthetic tranches, the value we assume is the respective recovery values shown in table 10 until the actual recoveries are determined through the ISDA protocol or the applicable valuation mechanism detailed in the transaction's documents. If the transaction documents specify fixed recoveries, we use the fixed recovery amounts.

32. If looking at a 'BBB' tranche rating, the tranche should have sufficient credit enhancement to survive the highest losses associated with the defaults of each of the following combinations of underlying obligors, assuming 5% recovery:

- The largest obligor rated between 'A+' and 'CCC-';
- The two largest obligors rated between 'BBB+' and 'CCC-';
- The three largest obligors rated between 'BB+' and 'CCC-';
- The four largest obligors rated between 'B+' and 'CCC-'; and
- The six largest obligors rated between 'CCC+' and 'CCC-'.

33. We would treat as defaulted any assets rated below 'CCC-' as described in paragraph 31 (in the 'AAA' test) for all tranche ratings.

34. 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 assets rated higher than the issuer's target rating on a CDO tranche. The larger the numbers of assets, the more likely it is that defaults of highly rated assets may occur. This test applies to transactions that had actual asset pools purchased at closing, as well as transactions with proposed asset pools that ramp up—or acquire new assets—after closing. Appendix A presents an example of how this test works.

35. In these criteria, the term "obligor" includes entities to which the CDO has direct exposure either (i) in the asset pool or (ii) as a third party. Direct third-party risk may exist where a default by a third party could cause a CDO to suffer a direct loss. For example, a CDO might allow 5% loan participations with a financial intermediary where the intermediary is not obligated to post collateral or replace itself on a rating downgrade. In participations, the intermediary retains the legal title to the subject loan, but transfers an economic interest to the CDO. In this case, the criteria treat the entire 5% to be an exposure to one obligor, since if the intermediary defaults the CDO's rights in the loan could be impaired.

36. The criteria apply the same treatment to similar types of exposures, including unhedged or unmodeled emerging markets sovereign risk, uncollateralized securities lending, and any other risks where an intermediary's default could impair the performance of the asset or the CDO's rights in the asset. If, in our view, the trustees' information on how much direct third-party exposure exists in the portfolio isn't clear, we ask the trustee and the collateral manager for this information. If this is not provided, we use the maximum concentrations allowed as per the transaction documents.

37. As a CDO transaction starts amortizing with the tranches being paid down, the largest obligor default test may not apply to a tranche if it meets certain conditions, namely that:

- The subject tranche is the most senior outstanding tranche in the transaction;
- The tranche immediately below it in the capital structure passes the largest obligor test;
- The tranche below it is rated no more than one full rating category below the subject tranche; and
- The tranche is expected to be retired within the next six months based on scheduled distributions.

Largest industry default test

38. The RFC proposed that 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 zero recoveries. For this test we use the same industry classification as used in 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 (not including excess spread) to survive the default of 12% of the asset pool with no recoveries. This is even if the CDO Evaluator simulation model indicates that a lower level of credit enhancement would be sufficient.

39. Most of the comments we received from the RFC about the largest industry default test argued that the test may be unrealistic because in the real world an entire industry could not default and, in any case, there would always be some level of recovery higher than zero.

40. The final criteria include a recovery assumption of 17% rather than zero in the primary largest industry default test. The 17% assumption is the same recovery we assign to senior secured debt from Group 4 countries (see "Asset Recovery Assumptions" below). This test applies a higher recovery assumption than the largest obligor default test because recoveries across a whole industry imply an averaging effect. So, industry-wide recoveries are necessarily higher than the lowest recovery within the group. For sovereign securities, the largest industry default test does not apply.

41. 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.

42. 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.

43. 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 assets within each industry, assuming a 5% recovery:

- 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-'.

44. 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 assets within each industry, assuming a 5% recovery:

- 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-'.

45. 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.

46. The largest industry test is not applicable to CDOs of hybrid trust preferred securities. Even though these securities use corporate asset default rates for the underlying assets, for the purposes of our criteria, they may be viewed as a single industry. In such transactions, we address the industry risk as explained in "Global Methodology For Rating Trust Preferred/Hybrid Securities Revised," published Nov. 21, 2008.

Updates To CDO Evaluator

Background

47. The RFC proposed to recalibrate CDO Evaluator to generate obligor default scenarios that reflect extreme economic stress when analyzing 'AAA' rated tranches. To mitigate model risk the RFC proposed using specific output targets to drive the recalibration. We intend for every security we rate 'AAA' to be able to withstand an extreme degree of stress without defaulting.

48. The final criteria embody a recalibration 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 now reflects our views of the expected defaults under different level of stress, commensurate with our ratings definitions.

49. Additionally, in our view, the experience of the 2008-2009 financial disruptions has highlighted the value of employing analytical tools in addition to Gaussian copula models (see "Note 1" below). We are sensitive to the possibility that any model may not fully capture real-world dynamics as it transforms 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, in deciding to continue to use such a model in our corporate CDO analysis, 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.

50. The actual process of recalibrating CDO Evaluator, therefore, started with the construction of a table of minimum 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 the widest possible diversification. 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 likely outcome, regardless of the

modeling framework. Before discussing recalibration, 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. However, for modeling purposes we sometimes use the somewhat artificial and simplifying assumption that each rating category has a specific associated default probability.

51. The first consideration in establishing the targeted default table was an analysis of Standard & Poor's CreditPro database of corporate defaults since 1981 (see Appendix B for an explanation of the methodology used to compute defaults). From the CreditPro database (for the U.S., Canada, Western Europe, Australia, and New Zealand), we extracted the maximum observed default rates for different rating categories over varying time horizons (see table 2). Comparing the default rates of corporate credits rated in different rating categories, according to our CreditPro data, we observed that 'BBB' has historically been the cusp category—bonds rated lower had much higher default rates and those rated higher had significantly lower default rates. We also 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. 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 issuers or issues to withstand this stress without defaulting.

52. 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, one for the 'AA' stress would have to reflect substantially higher default rates, and 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 timeframe.

Table 2

Post-1981 Maximum Observed Corporate Default Rates From Standard & Poor's CreditPro Database

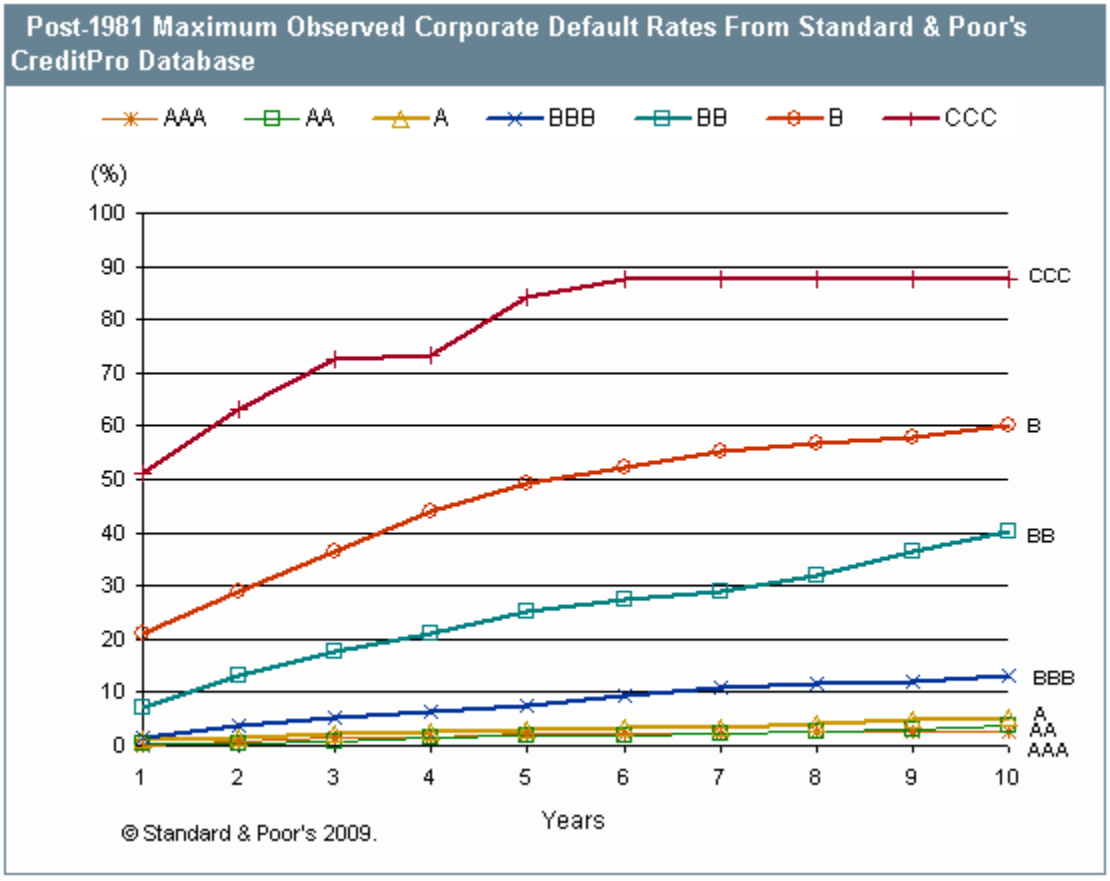
(%)

	CreditPro asset pool ratings						
Years	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	0.0	0.2	1.0	1.6	7.3	20.9	51.1
2	0.7	0.3	1.6	3.6	13.3	29.0	63.1
3	1.4	0.7	2.1	5.1	17.6	36.6	72.6
4	1.4	1.4	2.6	6.5	21.0	44.0	73.2
5	2.1	1.7	3.0	7.7	25.2	49.1	84.2
6	2.2	2.0	3.4	9.5	27.6	52.3	87.7
7	2.4	2.4	3.4	11.0	29.1	55.2	87.7
8	2.7	2.7	4.1	11.5	32.1	56.6	87.7
9	2.7	3.1	5.0	11.9	36.3	57.9	87.7

Table 2

Post-1981 Maximum Observed Corporate Default Rates From Standard & Poor's CreditPro Database (cont.)							
10	2.7	3.6	5.3	13.2	40.3	60.2	87.7

Chart 1



53. Examination of the post-1981 maxima reveals clustering of observed default rates for assets rated in the three highest rating levels (see chart 1). This could be explained by the fact that economic stress never reached a sufficient level in the post-1981 period for credit quality differences among corporate assets rated in those higher rating levels to become manifest. In addition, although the default rates for 'BBB' rated corporate assets are somewhat higher, the separation appears slight compared with the default rates for the lower rating categories. If the historical stress was more severe we would expect to see more separation related to 'BBB' corporate defaults.

54. 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 3).

Table 3

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

Source: 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).

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 rated 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

55. 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. Moreover, the Hickman study is oriented around par amount rather than instances of default. Nevertheless, Hickman's study remains, in our opinion, the most illuminating view of corporate credit default performance during the first half of the 20th century, and serves as one of our key reference points in recalibrating CDO Evaluator.

56. 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 4).

Table 4

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.

57. 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 minimum targeted portfolio default rates that 'AAA' rated CDO tranches should, in our view, be able to withstand.

58. 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.

59. The spacing of default rates between adjacent rating categories was a very important issue in our analysis. We believe that there should be meaningful differences between the default rates associated with adjacent rating categories at each time horizon. We decided to retain this requirement despite some very apparent anomalies in the historical data for bonds rated in the 'A' and 'BBB' categories. To do otherwise would amount to distorting the recalibration exercise by over-emphasizing the difference in creditworthiness associated with certain pairs of adjacent rating categories (e.g., 'BB' and 'BBB') while under-emphasizing the difference in creditworthiness associated with other pairs (e.g., 'BBB' and 'A').

60. We started the table of minimum targeted portfolio default rates that 'AAA' rated CDO tranches are intended to withstand by first focusing on the three-year time horizon (see table 5).

Table 5

Targeted Minimum Corporate Asset Default Rates For 'AAA' Rated CDO Tranches							
Time horizon (years)	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1							
2							
3	$d_{3,AAA}$	$d_{3,AA}$	$d_{3,A}$	$d_{3,BBB}$	$d_{3,BB}$	$d_{3,B}$	$d_{3,CCC}$
4							
5							

61. By using post-1981 CreditPro data as a reference (see table 2), we wanted to find default values for differently rated asset pools so that:

$d_{3,AAA}>>1.4\%$, $d_{3,AA}>>0.7\%$, $d_{3,A}>>2.1\%$, $d_{3,BBB}>>5.1\%$, $d_{3,BB}>>17.6\%$, $d_{3,B}>>36.6\%$, and $d_{3,CCC}>>72.6\%$.

('AAA' asset defaults for three years have to be significantly greater than 1.4%, etc.)

62. However, notwithstanding that the CreditPro data reported a maximum three-year default rate for 'AAA' rated bonds that was actually higher than the three-year default rate for 'AA' rated bonds, we determined that:

$d_{3,AA}>d_{3,AAA}$

63. Next, we expanded along the columns from the starting row. We compared default rates in adjacent rows and columns, and adjusted (and re-adjusted) them to promote smooth progressions across the underlying asset rating categories and over different time horizons.

64. We preserved the roughly 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. We implicitly rejected an arithmetic progression because, we believe, it would have produced unreasonably high targeted portfolio default rates for underlying assets in the rating categories just below 'AAA'. Table 6 shows the results of our targeted default rates for corporate assets for 'AAA' rated CDO tranches.

Table 6

Minimum Targeted Portfolio Default Rates For 'AAA' Rated CDO Tranches*

(%)

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

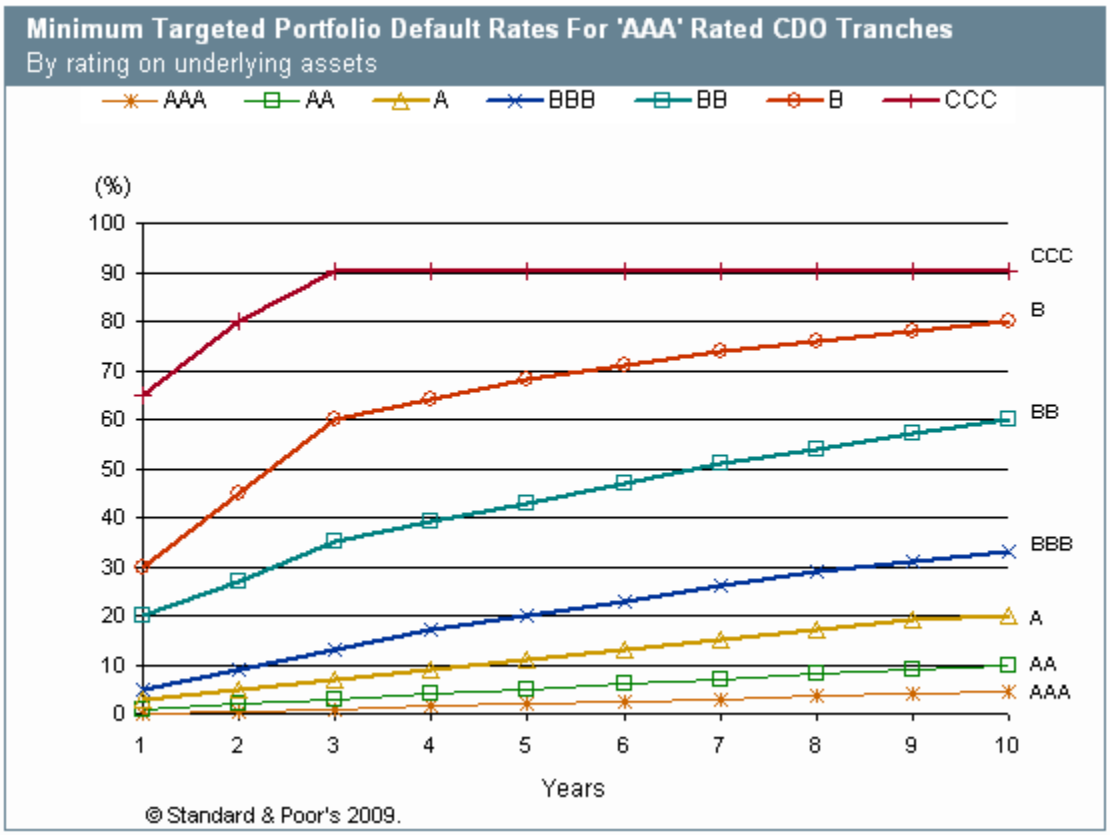
Table 6

Minimum Targeted Portfolio Default Rates For 'AAA' Rated CDO Tranches* (cont.)							
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 minimum default rate for a CDO tranche to be rated 'AAA', assuming (i) that the underlying asset pool has the best possible diversification, (ii) that the pool is composed entirely of assets rated at the level in the header row, and (iii) the asset pool's weighted-average life indicated in the left-most column. 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.

65. The values in table 6 can be represented graphically as follows.

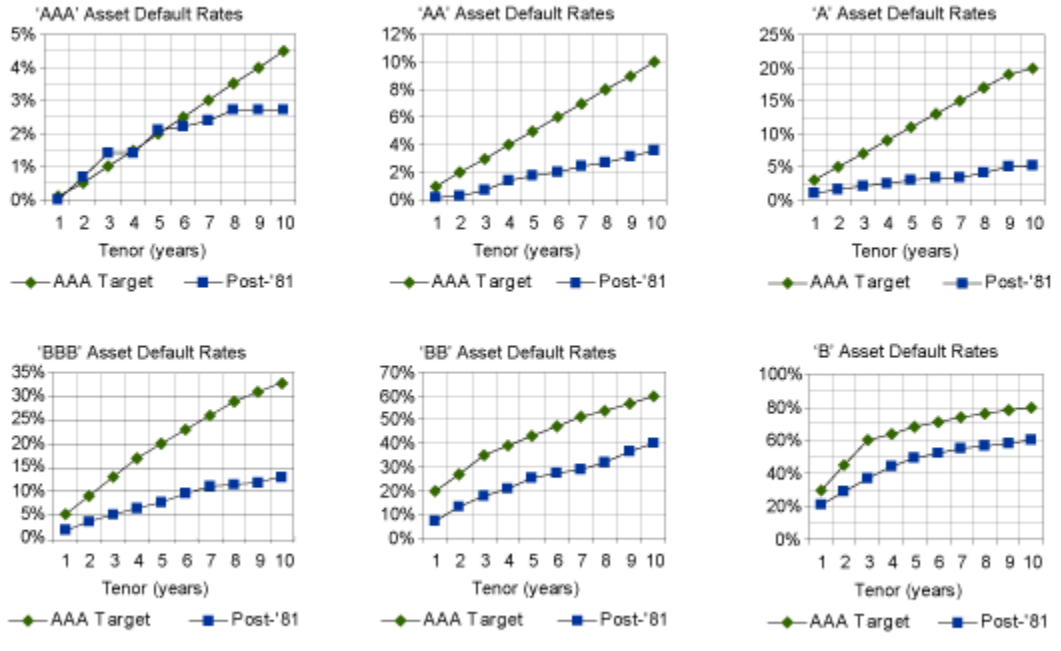
Chart 2



66. Note the orderly progression of default rates within each underlying asset rating category and among the different underlying asset rating categories without clustering.

67. It is instructive to compare the targeted portfolio default rates in table 6 to the post-1981 maxima reported in the CreditPro data. Chart 3 shows the comparisons.

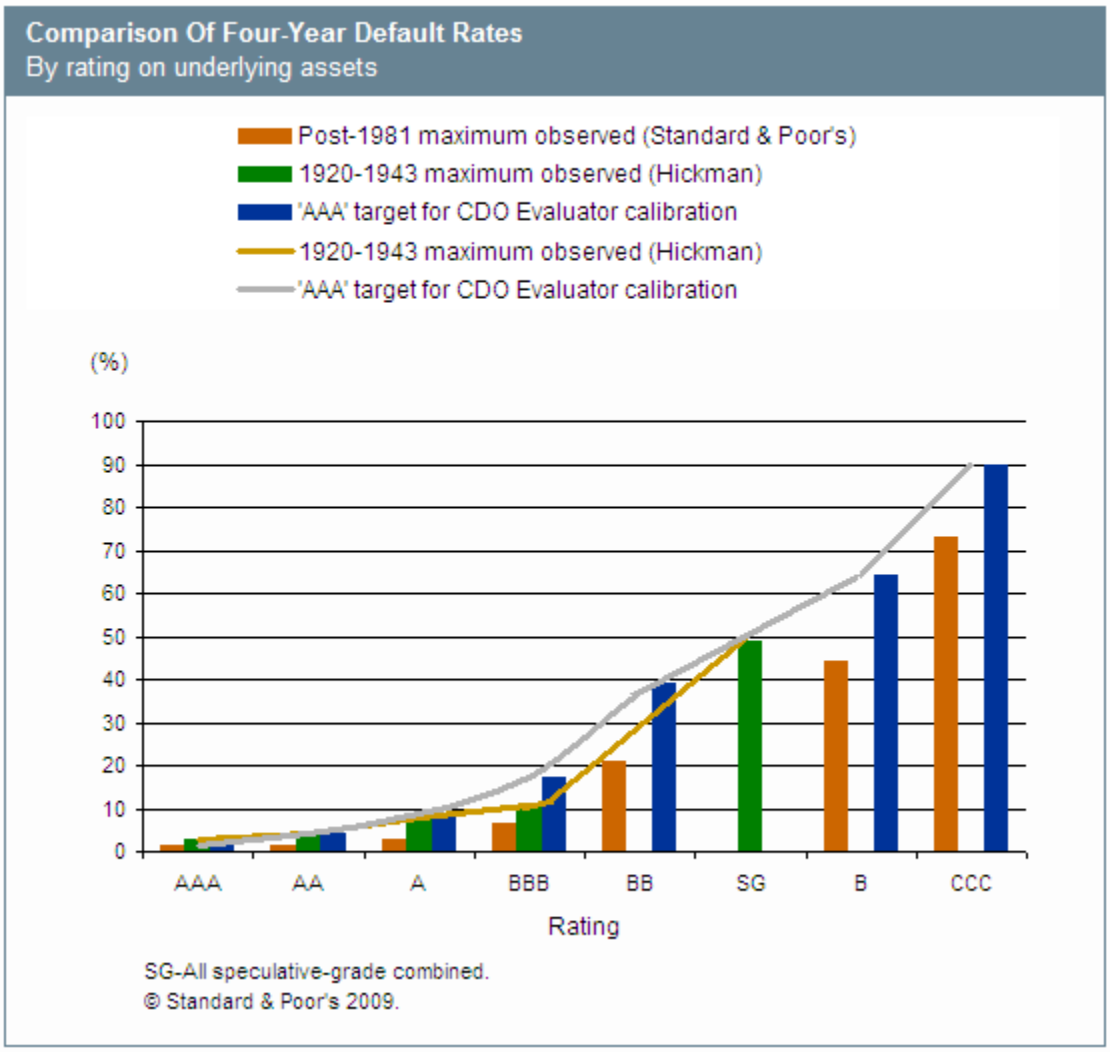
Comparison Of Target Default Rates for 'AAA' Rated CDO Tranches With Post-1981 Maximum Default Rates Reported In CreditPro Database (By Rating On Underlying Assets)



68. As expected, most of the targeted portfolio default rates provide a substantial cushion above the post-1981 observed maximum rates. However, there is some compression at the very top and bottom of the rating scale, especially for short time horizons. This shows that the real-world experience reflected in the CreditPro data to date lacks the idealized order of the targeted values (as shown in table 6 and chart 2), a further demonstration that the real world is never as tidy or predictable as one might like it to be. This may also reflect that the economic stresses after 1981 have not exceeded a 'BBB' stress. We certainly would expect to see more differentiation in the performance of assets rated between 'AA' and 'BBB' if we were to experience a 'AA' type of economic scenario.

69. It is also instructive to compare the targeted four-year default rates with both the post-1981 maxima and the maxima that Hickman reported for earlier periods. This is shown in chart 4.

Chart 4



70. In our view, this comparison further confirms that the targeted portfolio default rates for the four-year time horizon are at appropriate levels compared with both the lower-stress levels of the post-1981 period and the higher-stress levels of the 1920-1943 period.

71. Hickman found only slight differences in default rates for bonds rated in categories III and IV (in table 3), corresponding to Standard & Poor's ratings of 'A' and 'BBB'. Nonetheless, we do not treat those rating categories as being only slightly different. Accordingly, in constructing table 6, we maintained a roughly geometric progression of default rates across rating categories. This produces a larger difference in the targeted portfolio default rates for obligations rated at the 'A' and 'BBB' levels than Hickman reported in his findings.

CDO Evaluator input: Asset default rates

72. We used the targeted portfolio default rates that 'AAA' rated CDO tranches should be able to withstand (table 6) to create recalibrated modeling parameters for the CDO Evaluator simulation model. 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.

73. Once again, it is important to highlight that our ratings are not probabilities of default but rather address creditworthiness that reflects many factors. In limited cases, such as in the corporate CDO analyses, we use ratings in a uni-dimensional way, as a proxy for an asset's default rate, solely for modeling purposes.

74. We updated the modeling parameters for asset default rates as shown in table 7. Appendix C presents the full 30-year asset default table for all the ratings without ratings modifiers.

Table 7

Asset Default Rate Inputs For CDO Evaluator Simulation Model

(%)

	Rating						
Tenor (years)	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	0.003	0.018	0.198	0.462	2.109	7.848	20.495
2	0.016	0.074	0.452	1.092	4.644	14.782	34.623
3	0.041	0.172	0.771	1.896	7.476	20.935	44.486
4	0.085	0.318	1.159	2.868	10.488	26.397	51.603
5	0.150	0.514	1.622	3.995	13.587	31.246	56.923
6	0.240	0.763	2.162	5.258	16.698	35.560	61.036
7	0.361	1.069	2.780	6.639	19.767	39.406	64.313
8	0.514	1.433	3.476	8.116	22.758	42.850	66.996
9	0.704	1.856	4.246	9.669	25.645	45.945	69.243
10	0.933	2.339	5.088	11.281	28.413	48.740	71.164

The above five-year default rates are rounded to three decimal places.

75. We produced starting values for table 7 based on a methodology similar to the one we use to produce our annual default studies. We then adjusted those values slightly, primarily as a function of the default scenario targets given in table 6.

76. 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 ratings categories. We further adjusted it to better fit observed empirical cumulative default rates.

77. Ratings, however, also incorporate modifiers, such as CreditWatch, which indicate a possible rating change according to the type of modifier employed: CreditWatch negative or CreditWatch positive. To account for the potential downward ratings transition risk inherent in CreditWatch negative placements, the RFC proposed to treat the issuer credit ratings on credits on CreditWatch negative as if they were two notches lower to provide more conservative rating inputs into CDO Evaluator (e.g., BB+/Watch Neg becomes 'BB-'). For credits on CreditWatch positive, we are maintaining our current methodology of giving a one-notch upward adjustment to the rating.

78. Comments from the RFC on the CreditWatch adjustments were mixed, with most suggesting that the proposed

approach would be too onerous and expressing concerns regarding the asymmetrical notching of CreditWatch negative and CreditWatch positive.

79. On further review of the matter, we decided to set the CreditWatch negative adjustment for corporate assets to one notch.

CDO Evaluator input: Correlation

80. 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 simplifying assumptions are, by their nature, qualitative, we believe that they are reasonable for reducing the complexity of the modeling process and enhancing its transparency.

81. Moreover, as previously described, to enhance the overall analysis, and lessen dependence on input parameters, we added the new supplemental tests and recalibrated the CDO Evaluator model with targeted outputs. We are also aware of the recent experience of CDOs of structured finance securities. The degree of correlation observed among the assets in these transactions' underlying portfolios since 2006 has been far higher than the correlation observed in earlier times (see "Special Report: Loss Correlations Among U.S. Consumer Assets" under "Related Research").

82. The correlation parameters under the updated 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 updated criteria provide for correlation of 0.05 between assets from different industries in different geographic regions. By increasing correlation, the updated criteria fatten the tails of the simulated default frequency distribution and move the expected level of defaults closer to the aforementioned CDO Evaluator default targets. Appendix D shows the correlation assumptions by asset type.

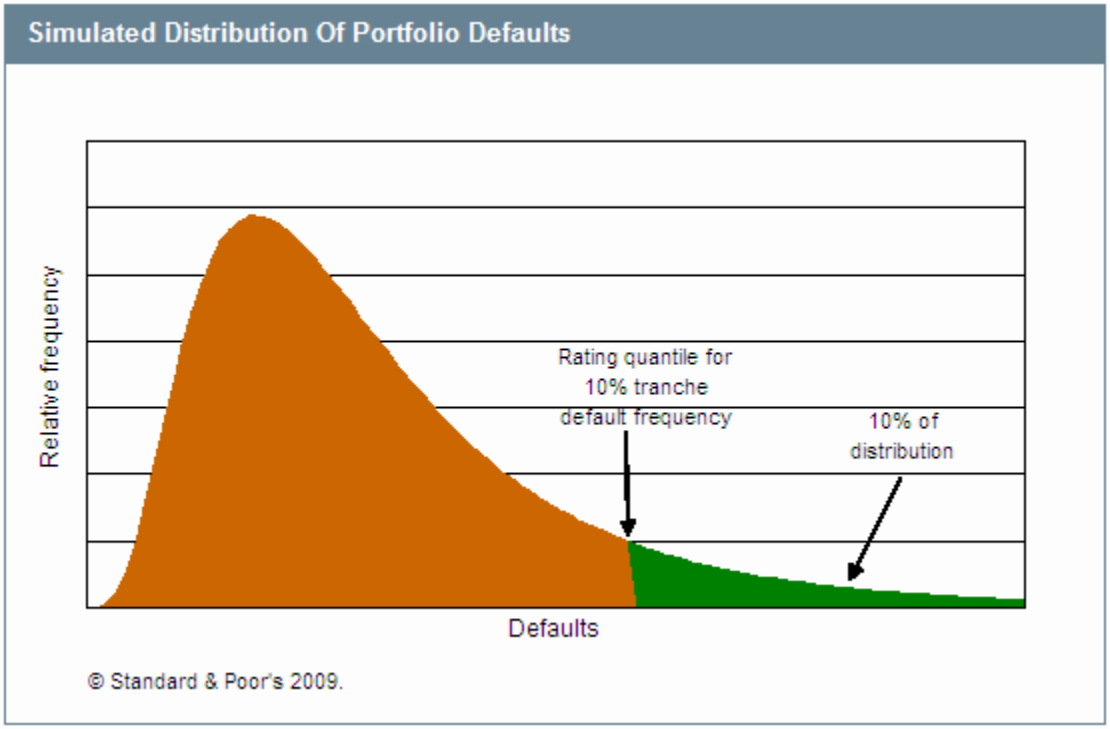
Ratings quantiles and results calibration

83. The model needs 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. Chart 5 shows that, given a ratings quantile, it is possible to determine the amount of simulated defaults and thus the credit support appropriate for the corresponding rating level for corporate CDO tranches (before the effect of the supplemental tests).

84. A full technical explanation of rating quantiles is outside the scope of this article (see "CDO Evaluator Applies Correlation and Monte Carlo Simulation to the Art of Determining Portfolio Quality" and "Global Cash Flow and Synthetic CDO Criteria" under "Related Research").

85. However, in brief, the concept behind the rating quantiles and how they affect our rating results is as follows: CDO Evaluator first runs a Monte Carlo simulation of defaults, which produces a simulated distribution of defaults as shown in chart 5. 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 5



86. To achieve this, the updated criteria adjust the rating quantiles so that the model reflects the targeted benchmarks given in table 6. 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 6. Accordingly, the rating quantiles are a principal device for recalibrating the CDO Evaluator model.

87. As chart 5 shows, the modeled default frequency for a CDO tranche corresponds to the area of the default distribution to the right of a specified rating quantile. Moving the quantile point to the right amounts to strengthening the tranche's credit quality since it has to withstand more defaults, while moving the rating quantile to the left amounts to weakening the tranche's credit quality since it has to withstand fewer defaults.

88. Because the model recalibration targets minimum asset default rates that a 'AAA' rated CDO tranche should be able to withstand, the criteria allow the model's rating quantile parameters to be different from the corresponding asset default rate parameters. Indeed, doing so is necessary for achieving calibration outputs with appropriate differentiation between default frequencies of adjacent rating categories (as discussed in paragraph 68). We believe this differentiation is also likely to improve the rating stability of the CDO tranche. Appendix E presents the new rating quantiles table.

CDO Evaluator output: Calibration results

89. To recalibrate CDO Evaluator to the targeted portfolio default rates in table 6, we used highly diversified portfolios of corporate credits. We ran these pools of assets using the new CDO Evaluator assumptions—as given in this section—to produce the projected scenario default rates (SDRs) shown in table 8 for 'AAA' rated corporate CDO liabilities. SDRs are the modeled level of gross defaults that CDO Evaluator estimates for every CDO liability rating. For a CDO tranche to be assigned a particular rating, it should at a minimum withstand a level of gross simulated

defaults that is higher than the SDR that CDO Evaluator estimates for that rating, plus the applicable cash flow stresses. The tranche should also pass the supplemental tests.

90. For the calibration, the pools were composed of 258 assets uniformly distributed across all the CDO Evaluator industry categories. All the assets had the same credit rating (without any plus or minus ratings qualifiers).

Table 8

'AAA' Scenario Default Rates For Different Asset Pools

(%)

	Asset rating						
Tenor (years)	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	0.8	1.6	4.7	8.1	20.9	41.5	65.9
3	1.6	3.1	8.1	14.7	34.1	59.7	83.3
5	2.3	5.0	10.9	20.2	43.0	68.2	88.4
7	3.5	7.4	14.0	25.2	50.4	73.3	90.7
9	4.7	9.7	17.1	30.2	56.2	77.1	91.9

91. Next we compared the modeled SDRs to the minimum targeted portfolio default rates that CDO tranches should withstand to qualify for a rating of 'AAA' (table 6). Table 9 shows the ratio of the modeled SDR in table 8 to the corresponding minimum targeted portfolio default rate in table 6. This shows a "coverage ratio" of model results relative to the targets.

Table 9

New 'AAA' CDO Evaluator SDR Divided By Targeted 'AAA' Output

(%)

	Asset rating						
Tenor (years)	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	775.2	155.0	155.0	162.8	104.7	138.2	101.4
3	155.0	103.4	116.3	113.3	97.5	99.5	92.6
5	116.3	100.8	98.7	100.8	100.1	100.3	98.2
7	116.3	105.2	93.0	96.9	98.8	99.0	100.8
9	116.3	107.7	89.8	97.5	98.6	98.9	102.1

92. Table 9 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 multi-year default rates be derivable from one-year default rates.

93. While there were some variations in the results, we believe the results are sufficiently close that continued use of the recalibrated CDO Evaluator model is analytically appropriate for the following reasons:

- There are very few corporate CDOs where the average collateral ratings are above 'A' or the maturities are less than three years. Most rated transactions have assets in the 'BBB' to 'B' range and maturities of five to nine years.

Recalibrated model results are quite close to their corresponding targets in that range.
- The absolute default rates, for the pools where higher ratios occur, are relatively small and the transaction ratings in such cases would likely be driven by the new supplemental stress tests.
- The hypothetical pools we used in recalibrating the model were highly diversified. Actual CDO pools are generally more concentrated and are likely to produce SDRs higher than the hypothetical pools produce. This would increase the coverage relative to the targeted outcomes.

94. For 'CCC' rated asset pools, given that the actual default rates are very high, it is mathematically impossible to get coverage ratios much above 100%.

Asset Recovery Assumptions

95. The RFC proposed to link recovery rates with default rates to reflect their observed inverse relationship. This is based on historical observations that indicate that asset recovery levels have generally been linked to the level of stress in the economy and to the level of defaults. Under the proposal, defaulted assets would have a different recovery rate based on the level of defaults in the default simulation.

96. The updated criteria retain the prior analytical framework for recoveries, but reduce recovery assumptions. Also, for synthetic CDOs we now tier expected recovery levels based on the tranche rating, similar to what was and continues to be our criteria for cash flow CDOs. Our analytical framework differentiates corporate recoveries based on asset type (loans vs. bonds) and on the priority/seniority of the asset (senior secured, senior unsecured, subordinated) on an insolvency of the company. We introduced this framework in 1996 and subsequently refined it based on the information in our LossStats database, which tracks recoveries on defaulted assets.

97. In addition to using recoveries based on asset type, we use our asset recovery ratings and other information, where available, to determine recovery rates for assets in a cash flow CDO.

98. Further, our recovery methodology tiers recoveries based on the rating on the CDO tranche. This reflects empirical evidence that recovery rates are inversely related to default rates. For both cash flow CDOs and synthetic CDOs, the recoveries in table 10 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 asset type

99. Table 10 shows the updated recovery assumptions for corporate and sovereign assets held in a CDO, based on the different corporate asset types (loans/bonds, seniority, and security) and country groupings. For synthetic CDOs, we use the "senior unsecured bonds" asset type as our base case recovery assumption and we apply additional haircuts—or deductions—for "old restructuring." These recoveries replace the corporate and sovereign recovery assumptions detailed in the article "Updated Global Recovery Rates For Use In Cash Flow CDOs," published July 23, 2007. See "Country recovery groupings" below for the countries in each different group.

Table 10

Standard & Poor's Corporate Asset Recovery Rates For CDOs

(%)

Instrument/country grouping	CDO liability rating					
	AAA	**AA**	**A**	**BBB**	**BB**	**B/CCC**
Senior secured loans first-lien						
Group 1	50	55	59	63	75	79
Group 2	45	49	53	58	70	74
Group 3	39	42	46	49	60	63
Group 4	17	19	27	29	31	34
Senior secured cov-lite loans/senior secured bonds						
Group 1	41	46	49	53	63	67
Group 2	37	41	44	49	59	62
Group 3	32	35	39	41	50	53
Group 4	17	19	27	29	31	34
Mezzanine/second-lien/senior unsecured loans/senior unsecured bonds						
Group 1	18	20	23	26	29	31
Group 2	16	18	21	24	27	29
Group 3	13	16	18	21	23	25
Group 4	10	12	14	16	18	20
Subordinated loans/subordinated bonds						
Group 1	8	8	8	8	8	8
Group 2	10	10	10	10	10	10
Group 3	9	9	9	9	9	9
Group 4	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

Country recovery groupings

100. For different asset types' recoveries, we have grouped different countries based on our analyses 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. Countries in Group 1 have legal frameworks that give the senior lenders more control and likely higher recoveries for senior lenders but lower for subordinated lenders. Countries in Group 3 have a legal framework that gives less priority to senior claims relative to the other creditors. The country groupings shown in table 11 are generally based on the article, "Insolvency Regime Jurisdictions Ranked By Standard & Poor's," published May 6, 2014.

101. Table 11 shows our country classifications for the purposes of CDO recoveries.

Table 11

CDO Country Groupings For Recovery

CDO Group 1	CDO Group 2	CDO Group 3	CDO Group 4
Australia	Austria	Brazil	Kazakhstan
Denmark	Belgium	France	Russia
Finland	Canada	Greece	Ukraine
Hong Kong	Germany	Italy	Others
Ireland	Israel	Mexico	
The Netherlands	Japan	South Korea	
New Zealand	Luxembourg	Spain	
Norway	Portugal	Taiwan	
Singapore	South Africa	Turkey	
Sweden	Switzerland	United Arab Emirates	
U.K.	U.S.		

Recoveries based on recovery ratings

102. Since our introduction of recovery ratings in CDOs in October 2006, most newly structured CDOs have incorporated the recovery rating methodology. We intend to review the recovery rating distributions of the assets in a specific CDO as part of our surveillance effort, and then factor those distributions into our CDO analyses.

103. As part of this criteria update, we also revisited the assumptions related to expected recoveries based on recovery ratings. Table 12 presents our updated assumptions for assets with recovery ratings. In addition to the recovery rating, we may publish reports that further delineate whether a loan's expected recovery resides in the upper or lower end of the range for a given recovery rating. This more granular delineation will generally apply for assets with recovery ratings of '2' through '5'. If the report indicates that a loan's expected recovery resides in the upper end of the range, we will use the recovery rates in the upper range in table 12 for a given recovery rating and CDO target rating. Absent any such information, we will use the lower range in table 12.

Table 12

Recovery Rates For Assets With Recovery Ratings (%)

Recovery rating	Range from published reports*	AAA	AA	A	BBB	BB	B/CCC
1+	100	75	85	88	90	92	95
1	90-100	65	75	80	85	90	95
2	80-90	60	70	75	81	86	90
2	70-80	50	60	66	73	79	80
3	60-70	40	50	56	63	67	70
3	50-60	30	40	46	53	59	60
4	40-50	27	35	42	46	48	50
4	30-40	20	26	33	39	40	40
5	20-30	15	20	24	26	28	30
5	10-20	5	10	15	20	20	20
6	0-10	2	4	6	8	10	10

*From Standard & Poor's published reports. If a recovery range is not available for a given loan with a recovery rating of '2' through '5', the lower range for the applicable recovery rating should be assumed.

104. If an asset doesn't have a recovery rating, then the criteria call for assessing 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 (e.g., 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.

105. If the CDO holds senior unsecured debt that doesn't have a recovery rating, and is subordinate to debt that has a recovery rating, then the recovery of the instrument can be determined using the tables shown in Appendix F.

Cash Flow Modeling Assumptions

Adjusted default timing for 'A' to 'B' rated cash flow CDO tranches

106. A cash flow analysis and the associated cash flow stresses are key components of these criteria. The prior criteria applied different default timing scenarios to allocate defaults over time. In addition, some scenarios provided for delayed starts of several years before the onset of defaults.

107. The RFC proposed to stress all tranches by applying the same starting times and default patterns at all tranche rating levels. The comments received from market participants on this proposal were that these proposed stresses are appropriate, and we are adopting this approach.

108. The updated criteria apply different default timing scenarios based on the weighted average life of the portfolio. Although we run each of the standard default patterns beginning in year one, we also delay the start of these patterns by a longer period to capture the effect of later defaults at the higher tranche ratings. Certain transactions have structural features that limit reinvestments and effectively turn the transactions into static pools if such triggers are hit. In such cases we would adjust our default pattern starting times to reflect the remaining life of the asset pool. In applying the cash flow test, the criteria consider the remaining exposure period for each rated CDO tranche.

109. The examples provided in table 13 illustrate the starting years. For fractions of years, the determining point is the half-year mark. Table 13 does not apply to CDOs of hybrid trust preferred securities.

Table 13

Starting Years Of Standard Default Patterns For 'AAA' To 'B' Rated Corporate CDOs

Portfolio weighted-average life (years)	Starting years
8.0	1-4
8.3	1-4
9.0	1-5
10.0	1-6
10.7	1-7
11.0	1-7
12.0	1-8

Break-even result analysis for cash flow CDOs

110. Under the updated criteria, part of the cash flow analysis remains the consideration of a tranche's 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 using different starting times for defaults, different patterns of how the defaults will occur once defaults start, and different interest rate scenarios.

111. After the reinvestment period or in the case of static transactions, after a period of time, when the collateral in the transaction starts to amortize and pay down the notes, the assets' weighted-average life also compresses. During this phase, the application of the standard four- and five-year default patterns and timings on transactions may not be appropriate, as the majority of assets in the transaction may have already paid down before the application of the default vector and stresses. Accordingly, as the assets' weighted-average life continues to shrink, we adjust the default patterns to three years. Table 14 shows the different default patterns that we use for corporate CDOs, excluding CDOs of hybrid trust preferred securities.

Table 14

Annual Defaults As A Percentage Of Cumulative Defaults

	(%)				
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Pattern I	15	30	30	15	10
Pattern II	40	20	20	10	10
Pattern III	20	20	20	20	20
Pattern IV	25	25	25	25	-
Short I	50	25	25	-	-
Short II	25	50	25	-	-
Short III	25	25	50	-	-
Short IV	40	30	30	-	-
Short V	33	33	34	-	-

112. For asset pools that have maturities of less than three years, we construct specific asset default curves based on the maturity profile of the assets.

113. Each cash flow run produces a different "scenario BDR" for that tranche based on the structural mechanics of the transactions and the amount of losses covered using excess spread. We then rank the scenario BDRs from the lowest to the highest. Next, we apply the percentiles in table 15 to select (or interpolate) a "tranche BDR" from the list of scenario BDRs. If the tranche BDR is lower than the SDR calculated in CDO Evaluator, the tranche might not under our criteria be assigned the rating accompanying that stress scenario.

Table 15

Break-Even Percentiles By Rating

CDO tranche rating	Percentile (%)
AAA	5
AA	5
A	10

Table 15

Break-Even Percentiles By Rating (cont.)	
BBB	10
BB	20
B	30
CCC	40

114. Table 16 shows a hypothetical example of how this analysis works. In a real transaction the difference in BDRs between the 'AAA' tranche and the 'B' tranche is typically much greater. We would first run all the applicable cash flow runs for each tranche to determine the scenario BDRs for each rating level. Next we would sort the BDR from high to low for each potential tranche rating. We would then apply the appropriate percentile to the BDR distribution to determine the tranche BDR. We use a percentile function similar to Microsoft® Excel® for this. If the tranche BDR is higher than the SDR given by CDO Evaluator for the potential tranche rating (and the tranche also passes the largest obligor and industry default tests), then we can assign that rating to the tranche. If this is not the case, then we might assign a lower rating to the tranche at which it passes all applicable tests.

Table 16

Sorted Break-Even Default Rates: Hypothetical Example			
Tranche	**A**	**B**	**C**
Rating	AAA	A	B
Default pattern (years)	**Sorted break-even default rates (%)**		
1	50	45	40
2	48	42	35
3	46	39	30
4	44	36	25
5	42	33	23
6	40	30	21
7	38	27	20
8	36	24	18
9	34	21	17
10	32	18	16
11	30	17	12
12	28	15	11
13	26	14	10
14	24	14	9
15	22	13	8
Break-even calculation			
Rating	AAA	A	B
Percentile	5th	10th	30th
Break-even rate (%)	23.4	14.0	12.8

115. The BDR analysis discussed in paragraph 114 assesses whether a transaction can withstand different patterns of defaults. However, we also focus on:

- The distribution of scenario BDRs to consider whether the results are skewed;
- Whether BDR "failures" are associated with certain default patterns and timings;
- The distribution of BDRs obtained by percentiles relative to the distribution of expected default rates under the different sensitivity analyses; and
- The comparison of scenario BDRs to our forecast of corporate default rates over the coming three years.

Modeling a minimum upfront management fee

116. The ability of a collateral manager to monitor underlying credits in a CDO and manage CDO transactions may be affected by a potential decrease in fee revenues if the manager has a small amount of assets under management. This can happen, for example, if a CDO transaction breaches its lower overcollateralization tests due to the discount purchase test or 'CCC' par value penalties incorporated in the overcollateralization tests. In such a case, secondary management and management incentive fees could be suspended, and the CDO manager would receive only the primary management fee, which could be quite small. In our opinion, some managers may not be able to retain and support adequate staff to manage transactions if they receive only primary management fees.

117. To address this issue, the RFC proposed to model transactions with a minimum 50 basis points (bps) primary fee if the collateral manager has less than $2.5 billion total assets (CDOs plus other fee-generating assets) under management. Under this proposal, we would model the actual primary fee if it is higher than 50 bps. However, if the primary fee is less than 50 bps, we would still model the minimum 50 bps fee.

118. Market participants provided mixed comments on this issue. Some comments supported the idea of a 50 bps modeled fee, while others thought that the level of fees should not be a matter of concern for rating agencies and that the market should dictate CDO management fee levels. The new criteria adopt the minimum 50 bps management fee as proposed.

119. Based on the comments, it appears that some market participants ascribe only slight importance to the role of a collateral manager in a CDO transaction. In our opinion, the collateral manager can have a major role in the current and future performance of the transaction. Thus, there is a credit dependency between a manager and the ratings in the transactions managed by it. Since most asset managers and organizations that manage CDO transactions are not rated, there must be some mitigating factors that weaken this credit dependency. Generally, this mitigating factor is the CDO noteholders' ability to replace the manager should the transaction start to underperform. Having sufficient fees at the top of the payment waterfall to attract a new manager is important for a transaction, in our view. Increasing upfront management fees for a replacement manager after the transaction has closed could lead to a rating downgrade to the senior CDO tranches. Accordingly, as we strive to enhance the credit stability of CDOs, we now model a minimum 50 bps primary fee for all CDO transactions that are managed by a manager that has less than $2.5 billion total assets under management.

Additional Rating Considerations

120. As detailed in the RFC, rating committees may consider certain factors in assigning ratings to CDO tranches, in addition to the supplemental tests, the Monte Carlo default simulation results, and the associated cash flow modeling. As a general matter, the rating committees consider both the risks and the risk mitigants on a

transaction-by-transaction basis. Additionally, they also consider the factors listed below. Based on our view regarding the relationship between the various risks and the risk mitigants, the committees may qualitatively adjust ratings from the rating level that may be indicated by the various quantitative results. We provide the rationale for such adjustments in the associated rating action media releases.

Credit stability

121. In October 2008, we published criteria addressing credit stability (see "Standard & Poor's To Explicitly Recognize Credit Stability As A Rating Factor" under "Related Research"). The stability guidelines specify for each rating level the maximum degree of projected credit deterioration under conditions of moderate stress for time horizons of one and three years. For example, we intend for 'AAA' ratings not to change more than one rating category in one year or three rating categories in three years under what we consider to be a moderate stress environment. A tranche's projected rating stability determines the maximum rating that it can achieve.

122. A key aspect of the targeted portfolio default rates for the recalibration process was the spacing of targeted portfolio default rates between adjacent rating levels. In a similar vein, we consider whether the modeled default frequencies for actual CDO tranches at different rating levels also display appropriate spacing. In our opinion, this has the benefit of moderating undesirable volatility of modeled creditworthiness. That is, appropriate spacing of modeled default frequency between adjacent rating categories helps reduce the problem of tranches flipping repeatedly between adjacent categories because of small changes in underlying asset quality.

123. We tested various asset portfolios and changed their ratings using a rating transition matrix as derived under our opinion of a moderate stress scenario. We then ran the resulting transition pools through the recalibrated CDO Evaluator to see the resulting changes in the CDO tranches' ratings. These analyses show that the resultant CDO tranche ratings would perform within the allowable credit stability guidelines. Thus, in our view, the new analytical framework presented in this article meets the credit stability guidelines.

Rating sensitivity to modeling parameters

124. We further apply sensitivity testing to three model parameters: Asset correlation, spread, and recoveries. These sensitivity analyses are different from the analyses of credit stability described above. The goal of these analyses is to further test the sensitivity of a transaction relative to key model parameters and to illustrate the effect that varying these parameters would have on model results. Given the diversified nature of the asset portfolios and similar structural mechanics, one would expect most transactions to respond similarly to different changes in stresses, absent idiosyncratic factors.

125. The salient issue is whether the model results and transaction structure display exceptionally high sensitivity to changes in input parameters. If they do, then it is our view that there must be some explanatory factor either in the transaction structure or in the portfolio construction that is causing such distinct behavior.

126. Rating committees may modify some of the modeling assumptions or applied stresses for portfolios that show heightened sensitivity to the following analyses:

127. Changes to correlation. The updated criteria call for consideration of sensitivity to correlation assumptions by running portfolios with the three correlation scenarios shown in table 17.

Table 17

Correlation Scenarios

	Within industry	Between industries
Below base case	0.150	0.050
Base case	0.200	0.075
Above base case	0.250	0.100

128. The above scenarios are for industries that display the new 0.200 intra-industry and 0.075 inter-industry correlations. As part of this scenario analysis, we also make adjustments to the industry correlation override tables for both above and below the base case scenarios. If the correlation is below 0.1 we adjust by an amount of 0.025 plus or minus. If the correlation is above 0.1, we adjust by an amount of 0.05 plus or minus.

129. Changes in recoveries. Empirical evidence suggests that recovery levels 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 variance in recoveries within a given origination or default vintage. Therefore, the updated criteria call for assessing additional scenarios with 10% positive and negative adjustments to recoveries relative to a transaction's weighted-average recovery.

130. Bias defaults toward largest assets, or assets with widest spread, or lowest recoveries. While asset composition in CDO pools tends to be fairly uniform around the mean, some portfolios are lumpy or skewed. To address this and assess whether the portfolios are sufficiently diversified, the updated criteria focus on specific default scenarios:

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

131. Some transactions may require additional credit support, in our view, or their tranches may receive lower ratings if their modeled performance is substantially weaker under the specific default scenarios compared with similar transactions.

132. The purpose of these specific default scenarios is to identify outliers that could potentially exhibit different performance. We compare transactions against other CDO transactions that have similar asset pool characteristics and similar structural features. The transactions serve as benchmarks for expected rating transition performance under the above-mentioned stresses to correlation, recoveries, and default biases. Based on this analysis, it is possible that the rating committee may assign lower ratings to CDO tranches that exhibit unusually high sensitivities to the three modeling parameters.

Focus on minimum portfolio standards

133. Most cash flow CDOs 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. However, in our experience, an asset manager may commit (barring credit deterioration of the assets) to manage a transaction's portfolio and maintain the original level of asset quality even though the transaction's governing documents allow for a weaker asset portfolio composition.

134. The criteria allow for rating a CDO transaction based on the manager either (i) managing the transaction to maintain the portfolio's original credit quality (the "stable quality" approach), or (ii) managing the transaction within the eligibility criteria of the governing documents (the "stressed portfolio" approach).

135. For us to apply the "stable quality" approach in rating a CDO transaction, we look for the manager to commit in the transaction's governing documents to run Standard & Poor's CDO Monitor test or the synthetic rated overcollateralization (SROC) test within the constraints of not breaching or maintaining the CDO Monitor or SROC tests (for "credit risk" trades, the manager is not constrained by these tests.) The CDO Monitor and SROC tests detect possible changes in an asset pool's credit quality when the manager carries out discretionary trading or trading of credit-improved assets.

136. For credit-risk trades (defined as trades where the credit is at risk of default or impairment) the CDO Monitor test is designed so that the manager may reinvest in any asset that fits within the minimum portfolio eligibility criteria without maintaining or improving the test results with the trade.

137. Alternatively, some transactions are structured from the start based on the "stressed portfolio" approach, even though the initial portfolios may be stronger. For such a transaction, the criteria deem the portfolio to comprise the minimum number of obligors concentrated in the minimum number of industries permitted in the documents. In addition, the updated criteria further apply the assumption that the largest obligors are all in the same industry and have the lowest ratings allowed by the eligibility criteria. Also, the criteria continue to 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 eligibility and reinvestment criteria. Certain transactions may have more precisely defined characteristics for the hypothetical "stressed portfolio" by mandating more precise and definitive asset eligibility, pool concentration, and reinvestment guidelines.

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

139. The "stressed portfolio" approach applies whenever a collateral manager does not commit in the transaction documents to maintain portfolio credit quality as described in paragraph 135 by using CDO Monitor, or whenever a manager breaches or repudiates such a prior commitment.

Small interest shortfalls

140. The cash flows of a given transaction might appear to be inadequate to pay full interest on nonpayment-in-kind tranches. If we believe this is due to the portfolio amortization profile, and if such model shows the tranche being able make the interest payment within the next payment period, the rating committee may choose to give weighting to such scenarios. 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. However, the modeling assumptions limit such nonconsecutive instances to no more than five instances.

Treatment of CDOs of corporate CDOs (CDO-squared transactions)

141. These criteria (including asset default rates and rating quantiles) apply to CDOs of corporate CDOs only when evaluating tranches rated higher than 'A+', on an interim basis, with the following adjustments:

- If 20% or more of the underlying exposures included in a transaction are corporate CDOs, we apply the supplemental tests on each of the inner CDOs. For a CDO-squared to receive a rating higher than 'A+', each inner CDO should withstand the supplemental tests, or the outer CDO should have sufficient credit support to absorb the losses not borne by the inner CDOs.
- If less than 20% of the underlying exposures included in a transaction are corporate CDOs, we consider all corporate CDOs to be one industry and the supplemental tests apply.
- Additionally, the criteria generally assume zero recoveries for junior CDO tranches, i.e., those tranches that we identify as subordinated to senior noteholders, which have controlling rights to liquidate the transaction if an event of default occurs from a coverage test failure.

Six-month rating transition

142. For static asset portfolios, the SDR of the portfolio decreases as the portfolio maturity gets shorter, all else being equal. This is due to the asset defaults rates decreasing as a function of time. Thus, all else being equal and assuming that the level of credit support is constant, it is possible that the rating on a CDO tranche supported by a static asset portfolio will improve as the maturity gets shorter. To avoid the possibility of downgrading a tranche only to upgrade it shortly thereafter, for the senior most tranche in any static transaction the rating committee looks forward six months at the expected SDR. If the analysis shows that the tranche may be the same rating as its present rating, then the rating committee may determine not to downgrade the tranche based on the current SDR.

Additional Changes In Methodology And Assumptions

Changes to correlation between corporate assets and CDO assets

143. From 2005-2007, corporate CDOs increased the concentration of CDO assets they hold in their asset pools. We believe this occurred in part due to the difficulties that collateral managers had in sourcing new corporate loans. As such, to stay fully invested and minimize negative carry, more and more managers purchased mezzanine tranches of other corporate CDOs. The updated criteria apply a correlation of 0.10 between corporate assets and corporate CDO tranches. The prior criteria assumed zero correlation between such assets.

Changes to correlation between corporate CDO tranches

144. Events in 2007-2009 have also highlighted that, because many corporate CDOs hold similar assets there can accordingly be an increased degree of correlation than previously thought. The updated criteria apply a correlation of 0.70 between corporate CDO tranches. This change will affect CDOs of CDOs—or CDO squared—transactions. Also, we now assume asset default rates for corporate CDOs to be the same as for corporate assets.

Changes to correlation override table in CDO Evaluator

145. Table 20 shows the correlation assumptions used in CDO Evaluator. The table has been expanded to include other asset types, such as project finance assets.

Treatment of other asset types in corporate CDOs

146. This criteria update applies to CDOs of corporate assets. However, some corporate CDO collateral pools may also contain structured finance securities and municipal debt securities. As an interim step, until we finalize the CDO criteria for the aforementioned asset types, we intend to treat these securities (excluding CDOs of corporate CDOs) as follows:

- We first analyze the portfolio using the version of CDO Evaluator we used before this criteria update solely on the corporate assets in the pool, excluding noncorporate asset classes. We then run the same version of CDO Evaluator on the mixed pool of corporate and other noncorporate asset types with the above-mentioned correlation changes. We generally expect that this second run would likely result in an increase in the gross default amount over the first run. We repeat the same using the current version of CDO Evaluator. We then add the gross default increase due to the noncorporate assets based on the version of CDO Evaluator used before this criteria update to the highest level of defaults obtained running either version of CDO Evaluator on the pool consisting solely of corporate assets.
- We deem pools where the default amounts are predominantly driven by the noncorporate assets as CDOs of structured finance assets, CDOs of sovereign debt, or CDOs of municipal debt. These will be subject to our criteria for such assets and not this corporate CDO criteria update.
- If the structured finance assets in the corporate CDO are themselves junior tranches of CDOs of structured finance assets and if senior noteholders have controlling rights to cause the liquidation of the transaction collateral due to an event of default from a coverage test failure, then we deem all such tranches as having a zero recovery.

Debt issuance relative to asset value

147. We believe that the market dislocation and liquidity squeeze in 2007-2009 have made it more difficult to differentiate between cheap but fundamentally attractive assets and assets that are distressed. The criteria for CDOs of distressed debt (see "Distressed Debt CDOs," published May 7, 2001) limit the issuance of rated CDO liabilities to what we believe to be the arm's-length purchase price of the assets, or to the amount of a third-party valuation. We believe this mitigates concerns about ratings arbitrage or managers attempting to exploit "loopholes." We do, however, have continuing concerns where:

- Deeply discounted collateral (of any type) is given par credit;
- Principal proceeds are recharacterized as interest proceeds;
- Structures allow large leakage of principal proceeds to equity investors; and
- Structures look to issue significantly more debt than the amount of money used to purchase the assets.

148. For transactions that display any of those features, we 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 the rating committee 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.

Criteria Round-Up

149. This criteria article is for cash flow CDOs backed by corporate debt (loans and bonds) and for synthetic CDOs that reference pools of corporate obligations. Additionally, it applies to CDOs of corporate CDOs and to CDOs of hybrid trust preferred securities.

150. These criteria apply to all new and existing corporate CDO transactions that contain well-diversified pools of corporate credits and have fairly uniform exposure to all the credits. Exposure refers to a number of parameters affecting the potential performance of the asset portfolio, including asset size, rating distribution, spread/premium distribution, and recovery prospects.

151. However, particular transactions may call for additional types of stress testing and analysis. For such transactions, we may apply these criteria as a starting point but as previously detailed, rating committees may qualitatively adjust ratings from the purely quantitative results.

Notes

152. Note 1: See, for example:

- Whitehouse, M., How a Formula Ignited Market That Burned Some Big Investors, Wall Street Journal, p. A1 (Sept. 12, 2005) (http://www.nowandfutures.com/download/credit_default_swaps_WSJ_news20050912.pdf);
- Malevergne, Y. and D. Sornette, Testing the Gaussian Copula Hypothesis for Financial Assets Dependences, University of California (Nov. 16, 2001) (http://129.3.20.41/eps/fin/papers/0111/0111003.pdf)

APPENDIXES

A: Example Of Largest Obligor Default Test

153. Let us assume we have a CDO asset pool comprising 70 corporate assets with $100 million par (see table 18). Within each rating category the asset size is equal.

Table 18

Example CDO Asset Pool—Breakdown By Rating

Asset rating	Number of assets	Amount (mil. $)	Amount per asset (mil. $)	Largest two rated from AAA to CCC- (mil. $)	Largest three rated from AA+ to CCC- (mil. $)	Largest four rated from A+ to CCC- (mil. $)	Largest six rated from BBB+ to CCC- (mil. $)	Largest eight rated from BB+ to CCC- (mil. $)	Largest 10 rated from B+ to CCC- (mil. $)	Largest 12 rated from CCC+ to CCC- (mil. $)
AAA	1	5.00	5.00	5.00	-	-	-	-	-	-
AA	1	3.00	3.00	3.00	3.00	-	-	-	-	-
A	8	16.00	2.00	-	4.00	8.00	-	-	-	-
BBB	10	10.00	1.00	-	-	-	-	-	-	-
BB	5	9.00	1.80	-	-	-	9.00	9.00	-	-

Table 18

Example CDO Asset Pool—Breakdown By Rating (cont.)										
B	25	25.00	1.00	-	-	-	-	-	-	-
CCC	20	32.00	1.60	-	-	-	1.60	4.80	16.00	19.20
Total gross dollar defaults				8.00	7.00	8.00	10.60	13.80	16.00	19.20
Total net dollar defaults with 5% recovery				7.60	6.65	7.60	10.07	13.11	15.20	18.24

154. In this example, for us to assign a CDO tranche a rating of 'AAA', it should have sufficient credit enhancement to survive the highest level of defaults of the largest amount calculated in the following five scenarios, assuming a flat 5% recovery:

- The exposure of the two largest obligors rated 'AAA' through 'CCC-' would be $7.60 million.
- The exposure of the three largest obligors rated 'AA+' through 'CCC-' would be $6.65 million.
- The exposure of the four largest obligors rated 'A+' through 'CCC-' would be $7.60 million.
- The exposure of the six largest obligors rated 'BBB+' through 'CCC-' would be $10.07 million.
- The exposure of the eight largest obligors rated 'BB+' through 'CCC-' would be $13.11 million.
- The exposure of the 10 largest obligors rated 'B+' through 'CCC-' would be $15.20 million.
- The exposure of the 12 largest obligors rated 'CCC+' through 'CCC-' would be $18.24 million.

155. Thus, under the test in this example, for us to rate this tranche 'AAA' it should be able to survive a $18.24 million loss. Conversely, the 'AAA' rated tranche cannot exceed $81.76 million under the largest obligor test. For transactions that have a foreign currency mismatch between the assets and the liabilities, we convert the assets to the currency of the liabilities based on the foreign currency risk hedges provided in the transaction.

156. As shown, depending on the composition and credit quality of the asset pool, as well as the issuer's target rating for a CDO tranche, the above tests may constrain the rating, regardless of the CDO Evaluator results.

B: Explanation Of Cohort Methodology For Asset Defaults

157. We conduct our default studies based on static pools or cohort groupings, and create static pools by grouping corporate issuers by rating category at the beginning of each period covered by the study. We observe the default and rating transition behavior of each static pool from that point forward. We assigned all corporate issuers included in the study to one or more static pools. When an issuer defaults, a default is realized in every cohort to which that obligor is included.

158. We use the static pool methodology to avoid certain pitfalls in estimating default rates. This enables default rates to account for rating migration and allows for default rates to be calculated across multi-period time horizons. Some methods for calculating default and rating transition rates might assign defaults against only the initial rating on the corporate asset while ignoring more recent rating changes that supply more current information. Other methods may calculate default rates using only the most recent year's default and rating data; however, this method may yield

comparatively low default rates during periods of high rating activity, as it ignores prior years' default activity.

159. The pools are static in the sense that their membership remains constant over time. Each static pool can be viewed as a buy-and-hold portfolio. However, it is not possible to compare static pools across different studies because errors, if any, are corrected by every new update and the criteria for inclusion or exclusion of companies in the default study are subject to minor revisions over time. Therefore, with every new update, we revise results back to the same starting date of Dec. 31, 1980, to avoid continuity problems.

160. We surveil entities whose ratings have been withdrawn—that is, revised to 'NR'—with the aim of capturing potential defaults. We exclude these companies, as well as those that have defaulted, from subsequent static pools.

161. For instance, the 1981 static pool comprises all companies rated as of 12:01 a.m. Jan. 1, 1981. Adding those companies first rated in 1981 to the surviving members of the 1981 static pool forms the 1982 static pool. All rating changes that took place are reflected in the newly formed 1982 static pool. We used this same method to form static pools for 1983 through 2007. Between Jan. 1, 1981 and Dec. 31, 2008 we added 11,777 newly rated organizations to form new static pools, while we excluded 1,542 defaulting companies and 5,571 companies whose last rating was classified as 'NR'.

162. We compute default rates for a static pool using a conditional probability methodology, which follows a cohort of issuers through time. As an example, suppose that we want to compute the five-year default rate for the cohort of issuers from January 1984. We compute the one-year default rate for these issuers by checking their ratings as of January 1985. We remove from the sample any issuers whose ratings we withdrew between January 1984 and January 1985 and do not include them in any further calculations. We follow the January 1984 cohort, which has had defaulted issuers and issuers with ratings withdrawn over the preceding one-year period removed, and compute the annual default rate for January 1985 to January 1986 with this adjusted cohort, assigning defaults according to the original rating held by the issuer in the January 1984 cohort. We repeat this process for every annual period until January 1989, removing any issuers with defaulted or withdrawn ratings from the preceding year from that year's cohort. We compute the five-year default rate from these one-year conditional default rates.

C: Asset Default Rate Inputs For CDO Evaluator Default Simulation Model

Table 19

30-Year Corporate Default Table

(%)

	Rating						
Year	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	0.003	0.018	0.198	0.462	2.109	7.848	20.495
2	0.016	0.074	0.452	1.092	4.644	14.782	34.623
3	0.041	0.172	0.771	1.896	7.476	20.935	44.486
4	0.085	0.318	1.159	2.868	10.488	26.397	51.603
5	0.150	0.514	1.622	3.995	13.587	31.246	56.923
6	0.240	0.763	2.162	5.258	16.698	35.560	61.036

Table 19

30-Year Corporate Default Table (cont.)

7	0.361	1.069	2.780	6.639	19.767	39.406	64.313
8	0.514	1.433	3.476	8.116	22.758	42.850	66.996
9	0.704	1.856	4.246	9.669	25.645	45.945	69.243
10	0.933	2.339	5.088	11.281	28.413	48.740	71.164
11	1.204	2.881	5.997	12.935	31.054	51.274	72.832
12	1.519	3.482	6.968	14.616	33.567	53.583	74.302
13	1.879	4.140	7.996	16.312	35.952	55.696	75.612
14	2.286	4.854	9.076	18.013	38.213	57.635	76.789
15	2.741	5.621	10.202	19.710	40.354	59.423	77.857
16	3.245	6.440	11.368	21.396	42.382	61.077	78.832
17	3.796	7.307	12.569	23.066	44.304	62.612	79.727
18	4.394	8.219	13.799	24.714	46.125	64.040	80.551
19	5.040	9.173	15.055	26.338	47.851	65.372	81.315
20	5.732	10.166	16.331	27.935	49.491	66.619	82.025
21	6.468	11.195	17.623	29.503	51.048	67.788	82.687
22	7.247	12.256	18.927	31.040	52.529	68.886	83.306
23	8.067	13.346	20.240	32.546	53.939	69.921	83.886
24	8.926	14.463	21.558	34.019	55.283	70.897	84.431
25	9.822	15.602	22.878	35.461	56.565	71.820	84.945
26	10.753	16.761	24.198	36.870	57.790	72.695	85.430
27	11.716	17.938	25.515	38.247	58.962	73.524	85.889
28	12.709	19.128	26.827	39.593	60.083	74.312	86.323
29	13.730	20.330	28.132	40.907	61.157	75.062	86.736
30	14.776	21.541	29.428	42.190	62.188	75.777	87.128

Note: Standard & Poor's applies the same default parameters to sovereign obligations that it applies to corporate obligations.

D: Correlation Override Table For CDO Evaluator Default Simulation Model

163. Table 20 reflects the correlation assumptions used in CDO Evaluator.

Table 20

Correlation Assumptions

	Correlation Between Assets With The Same Asset Type							
	Corp (local)	**Corp (regional)**	**Corp (global)**	**SF (excluding CDO)**	**CDO**	**Project finance**	**Muni**	**Sovereign**
Assets in the same country	0.200	0.200	0.200	0.700	0.700	0.200	0.150	1.000
Assets in the same region	0.200	0.200	0.200	0.600	0.700	0.200	0.150	0.200
Assets in different regions	0.050	0.050	0.200	0.500	0.700	0.050	0.050	0.050

Table 20

Correlation Assumptions (cont.)

Correlation Between Assets With Different Asset Types In The Same Country

	Corp (local)	Corp (regional)	Corp (global)	SF (excluding CDO)	CDO	Project finance	Muni	Sovereign
Corp (local)	0.075	0.075	0.075	0.075	0.075	0.075	0.050	0.200
Corp (regional)		0.075	0.075	0.075	0.075	0.075	0.050	0.200
Corp (global)			0.075	0.075	0.075	0.075	0.050	0.200
SF (excluding CDO)				0.400	0.300	0.075	0.050	0.200
CDO					0.300	0.075	0.050	0.200
Project finance						0.075	0.050	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	Muni	Sovereign
Corp (local)	0.075	0.075	0.075	0.050	0.075	0.075	0.050	0.100
Corp (regional)		0.075	0.075	0.050	0.075	0.075	0.050	0.100
Corp (global)			0.075	0.050	0.075	0.075	0.050	0.100
SF (excluding CDO)				0.300	0.300	0.050	0.050	0.100
CDO					0.300	0.075	0.050	0.100
Project finance						0.075	0.050	0.100
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	Muni	Sovereign
Corp (local)	0.050	0.050	0.050	0.050	0.075	0.050	0.050	0.050
Corp (regional)		0.050	0.050	0.050	0.075	0.050	0.050	0.050
Corp (global)			0.050	0.050	0.075	0.050	0.050	0.050
SF (excluding CDO)				0.200	0.300	0.050	0.050	0.050
CDO					0.300	0.075	0.050	0.050
Project finance						0.050	0.050	0.050
Muni							0.050	0.050
Sovereign								

Table 20

Correlation Assumptions (cont.)

Correlation Override Table

Asset sector	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
USM2	25	0.200	0.200	0.050
USM2	USM2	0.200	0.200	0.050
USM5	39	0.200	0.200	0.050
USM5	USM5	0.200	0.200	0.050
20	20	0.250	0.250	0.200
20	40	0.100	0.075	0.075
20	41	0.100	0.075	0.075
20	43	0.250	0.200	0.150
20	44	0.100	0.075	0.050
20	45	0.100	0.075	0.050
20	46	0.250	0.200	0.150
20	50	0.100	0.100	0.100
20	50A	0.100	0.100	0.100
20	50B	0.100	0.100	0.100
20	51	0.100	0.075	0.075
20	52	0.100	0.075	0.075
20	53	0.100	0.075	0.075
20	56	0.100	0.075	0.075
20	59	0.100	0.075	0.075
20	60	0.100	0.075	0.075
20	62	0.100	0.075	0.075
40	40	0.700	0.550	0.450
40	41	0.400	0.300	0.200
40	43	0.100	0.075	0.050
40	44	0.100	0.075	0.050
40	45	0.100	0.075	0.050
40	46	0.100	0.075	0.050
40	50	0.300	0.300	0.300
40	50A	0.400	0.400	0.400
40	50B	0.300	0.300	0.300
40	51	0.400	0.300	0.200
40	52	0.400	0.300	0.200
40	53	0.400	0.300	0.200
40	56	0.400	0.300	0.200
40	59	0.300	0.050	0.050
40	60	0.150	0.100	0.100
40	62	0.150	0.050	0.050

Table 20

Correlation Assumptions (cont.)				
41	41	0.700	0.550	0.450
41	43	0.100	0.075	0.050
41	44	0.100	0.075	0.050
41	45	0.100	0.075	0.050
41	46	0.100	0.075	0.050
41	50	0.300	0.300	0.300
41	50A	0.400	0.400	0.400
41	50B	0.300	0.300	0.300
41	51	0.400	0.300	0.200
41	52	0.400	0.300	0.200
41	53	0.400	0.300	0.200
41	56	0.400	0.300	0.200
41	59	0.300	0.050	0.050
41	60	0.150	0.100	0.100
41	62	0.150	0.050	0.050
43	43	0.250	0.200	0.175
43	44	0.100	0.075	0.050
43	45	0.100	0.075	0.050
43	46	0.200	0.125	0.100
43	50	0.100	0.100	0.100
43	50A	0.075	0.075	0.075
43	50B	0.075	0.075	0.075
43	51	0.075	0.050	0.050
43	52	0.075	0.050	0.050
43	53	0.075	0.050	0.050
43	56	0.075	0.050	0.050
43	59	0.075	0.050	0.050
43	60	0.100	0.100	0.100
43	62	0.075	0.050	0.050
44	44	0.200	0.200	0.050
44	45	0.100	0.075	0.050
44	46	0.100	0.075	0.050
44	50	0.100	0.100	0.100
44	50A	0.075	0.075	0.075
44	50B	0.075	0.075	0.075
44	51	0.075	0.050	0.050
44	52	0.075	0.050	0.050
44	53	0.075	0.050	0.050
44	56	0.075	0.050	0.050
44	59	0.075	0.050	0.050
44	60	0.100	0.100	0.100
44	62	0.075	0.050	0.050

Table 20

Correlation Assumptions (cont.)				
45	45	0.200	0.200	0.050
45	46	0.100	0.075	0.050
45	50	0.100	0.100	0.100
45	50A	0.075	0.075	0.075
45	50B	0.075	0.075	0.075
45	51	0.075	0.050	0.050
45	52	0.075	0.050	0.050
45	53	0.075	0.050	0.050
45	56	0.075	0.050	0.050
45	59	0.075	0.050	0.050
45	60	0.100	0.100	0.100
45	62	0.075	0.050	0.050
46	46	0.250	0.200	0.175
46	50	0.100	0.100	0.100
46	50A	0.075	0.075	0.075
46	50B	0.075	0.075	0.075
46	51	0.075	0.050	0.050
46	52	0.075	0.050	0.050
46	53	0.075	0.050	0.050
46	56	0.075	0.050	0.050
46	59	0.075	0.050	0.050
46	60	0.100	0.100	0.100
46	62	0.075	0.050	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

Table 20

Correlation Assumptions (cont.)

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
62	62	0.700	0.500	0.450
PF1	28	0.200	0.200	0.050
PF2	30	0.200	0.200	0.050
PF3	31	0.200	0.200	0.200
PF6	USM3	0.200	0.200	0.050
PF7	38	0.200	0.200	0.200
PF8	37	0.200	0.200	0.050
PF8	34	0.200	0.200	0.050
PF4	32	0.200	0.200	0.200
PF5	32	0.200	0.200	0.050
PF5	39	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

E: Tranche Rating Quantile For CDO Evaluator Default Simulation Model

Table 21

Tranche Rating Quantile For CDO Evaluator Simulation Model

(%)

	Rating						
Year	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**
1	0.001	0.018	0.248	0.692	2.637	8.633	21.520
2	0.006	0.074	0.566	1.638	5.805	16.260	36.354
3	0.017	0.172	0.963	2.844	9.345	23.028	46.710
4	0.034	0.318	1.449	4.302	13.110	29.036	54.183
5	0.060	0.514	2.027	5.992	16.984	34.371	59.769
6	0.096	0.763	2.703	7.888	20.872	39.116	64.087
7	0.144	1.069	3.476	9.959	24.709	43.347	67.529
8	0.206	1.433	4.345	12.174	28.447	47.135	70.345

Table 21

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

9	0.281	1.856	5.308	14.504	32.056	50.540	72.705
10	0.373	2.339	6.360	16.922	35.516	53.614	74.722
11	0.481	2.881	7.496	19.402	38.818	56.402	76.474
12	0.607	3.482	8.710	21.924	41.959	58.942	78.017
13	0.752	4.140	9.995	24.468	44.940	61.265	79.392
14	0.915	4.854	11.345	27.019	47.766	63.399	80.629
15	1.097	5.621	12.752	29.565	50.443	65.366	81.750
16	1.298	6.440	14.210	32.094	52.978	67.185	82.774
17	1.518	7.307	15.711	34.598	55.380	68.873	83.713
18	1.758	8.219	17.249	37.071	57.656	70.444	84.579
19	2.016	9.173	18.819	39.507	59.814	71.909	85.381
20	2.293	10.166	20.414	41.903	61.863	73.281	86.126
21	2.587	11.195	22.029	44.254	63.810	74.566	86.821
22	2.899	12.256	23.659	46.560	65.661	75.775	87.471
23	3.227	13.346	25.300	48.818	67.424	76.913	88.080
24	3.570	14.463	26.948	51.029	69.104	77.987	88.653
25	3.929	15.602	28.598	53.191	70.707	79.002	89.192
26	4.301	16.761	30.247	55.305	72.238	79.964	89.702
27	4.686	17.938	31.894	57.371	73.702	80.877	90.183
28	5.084	19.128	33.533	59.389	75.104	81.744	90.639
29	5.492	20.330	35.165	61.360	76.447	82.569	91.072
30	5.910	21.541	36.785	63.286	77.735	83.355	91.484

F: Recovery Rates For Assets Junior To Assets With Recovery Ratings

Table 22

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

Group 1

	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	-	-	-	-	-	-

Table 22

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

Group 2

	CDO liability rating					
Senior asset RR	**AAA**	**AA**	**A**	**BBB**	**BB**	**B/CCC**
1+	16	18	21	24	27	29
1	16	18	21	24	27	29
2	16	18	21	24	27	29
3	10	13	15	18	19	20
4	5	5	5	5	5	5
5	2	2	2	2	2	2
6	-	-	-	-	-	-

Group 3

	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	-	-	-	-	-	-

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

Table 23

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

Groups 1, 2, and 3

	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	-	-	-	-	-	-

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

RELATED CRITERIA AND RESEARCH

Related criteria

- Mapping A Third Party's Internal Credit Scoring System To Standard & Poor's Global Rating Scale, May 8, 2014
- Principles For Rating Debt Issues Based On Imputed Promises, Oct. 24, 2013
- Counterparty Risk Framework Methodology And Assumptions, June 25, 2013
- Guarantee Criteria--Structured Finance, May 7, 2013
- General Criteria: Global Investment Criteria For Temporary Investments In Transaction Accounts, May 31, 2012
- Global CDOs Of Pooled Structured Finance Assets: Methodology And Assumptions, Feb. 21, 2012
- Methodology For Analyzing Rating Confirmation Requests To Establish Subsidiary Special-Purpose Entities in CDOs, Dec. 9, 2009
- Surveillance Methodology For Global Cash Flow And Hybrid CDOs Subject To Acceleration Or Liquidation After An EOD, Sept. 2, 2009
- Methodology For Analyzing Rating Confirmation Requests To Replace Collateral Managers In Global CDOs, Aug. 13, 2009
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- The Use Of Rating-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
- Legal Criteria For U.S. Structured Finance Transactions: Special-Purpose Entities, Oct. 1, 2006
- CDO Spotlight: General Cash Flow Analytics For CDO Securitizations, Aug. 25, 2004
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Related research

- S&P Incorporating Additional Loan Recovery Information Into CLO Analysis, Aug. 1, 2014
- S&P To Provide Further Transparency In Recovery Ratings, July 18, 2014
- Use of CDO Monitor Simplified, April 7, 2014
- Standard & Poor's Rated U.S. CLO Assets Under Management By Collateral Manager As Of March 2014, June 20, 2014
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- How Deferrable Assets In CLOs Are Treated Under Standard & Poor's Methodology, Oct. 1, 2012
- CDO Spotlight: The Relationship Between Long-Dated Assets And Market Value Risk In U.S. Cash Flow CLOs, April 26, 2012
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- CLO Collateral Managers' Treatment Of First-Lien-Last-Out Loans Could Affect Payments To Investors, Oct. 14, 2010
- Standard & Poor’s Provides Guidance For Collateral Managers And Trustees Regarding CDO Monitor, Nov. 11, 2009

164. All criteria and related articles are available on RatingsDirect. The criteria can also be found on our Web site at www.standardandpoors.com.

165. These criteria represent the specific application of fundamental principles that define credit risk and ratings

opinions. Their use is determined by the issuer-specific or issue-specific attributes as well as Standard & Poor's Ratings Services' 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, or new empirical evidence that would affect our credit judgment.