Criteria | Structured Finance | Request for Comment:

Request For Comment: Global Trade Receivable Methodologies And Assumptions

March 23, 2021

OVERVIEW AND SCOPE

1. This article describes S&P Global Ratings' proposed global methodology and assumptions to rate asset-backed securities (ABS) backed by trade receivables.
2. These proposed criteria apply globally to all new and outstanding trade receivable, factoring, and supply chain financing transactions. The criteria also apply to trade receivable transactions used as collateral in partially supported asset-backed commercial paper (ABCP) conduits.
3. Typical characteristics of trade receivables include the following:
   - A trade receivable is a commercial payment obligation originated in the normal course of business between two commercial entities: a seller and its customer (the obligor), where goods or services have been supplied by the seller and the customer has been billed/invoiced. The receivable is the amount due to be paid under the invoice.
   - Generally, trade receivables represent billing for supply chain inventory, which means that obligors are incentivized to pay on time and in full, as it is important for them to maintain an ongoing relationship with the seller and a positive reputation in their markets.
   - The receivables are short term--usually between 30 and 90 days and not longer than a year.
   - The pools of obligors are well diversified (by the absolute number of obligors, typically more than 100 and also by the distribution of exposure).
   - The obligations are existing assets and are not subject to the future performance of the seller.
   - The obligations are unsecured.
   - The obligations are non-interest bearing.
   - A trade receivable will generally not meet the definition of a financial obligation that is covered by our issuer credit ratings as described in our global ratings definitions (see Related Research section).
   - The seller is a going concern when the receivables are sold to the issuer, and the issuer is structured to be a special purpose entity (SPE).
4. In a typical trade receivables transaction, an initial pool of receivables from one seller-servicer or

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group is purchased by the issuer in a revolving structure, and the purchase is funded by the noteholders. A factoring deal is one step removed from the typical trade receivables transaction, as the seller-servicer is the factoring company and the underlying receivables are generated by invoices issued by the factoring company's clients to their obligors and sold to the factoring company.

5. These proposed criteria will not apply to consumer assets such as store, charge, or credit cards, which would typically be rated under consumer ABS criteria (see Related Criteria section). However, the proposed criteria do apply to certain merchant credit card voucher payment arrangements. In such arrangements, the credit risks typically reside with the unconditional obligation of each participant to make payments to the next in the chain and are not linked to the consumers' creditworthiness. Future flow assets that depend on the future performance of the seller are not in scope and instead are generally rated under our nonfinancial or financial future flow criteria (see Related Criteria section). In limited cases, the proposed criteria could also be applied to short-term unsecured consumer obligations where we assess that the nature of the product or service provided creates an incentive to pay that is comparable to that of commercial obligors for their supply chain--for example, certain nondiscretionary services such as household energy supply.

6. Our principles of credit ratings (see Related Criteria section), set out the fundamental principles of structured finance ratings and criteria, identifying five analytical pillars (see chart below). The proposed framework for the analysis of trade receivables considers the risks associated with the credit quality and structural features of the underlying assets. The other pillars are primarily covered by the overarching other criteria listed in the Related Criteria section near the end of this article, though these proposed trade receivables criteria do speak to certain risks relating to all five pillars.

Five Pillars Of "Principles Of Credit Ratings" For Structured Finance

Pillar	What it involves
Credit quality	Analyzing the credit quality of the underlying securitized assets
Payment structure and cash flow mechanics	Analyzing payment structure and cash flow mechanics
Counterparty risks	Making sure that all financial counterparties have the minimum rating and replacement framework or remedies to be able to support the ratings on the transaction
Operational risks	Reviewing that the servicer and other relevant parties have the right tools, staff, and experience to perform their duties; assessing the potential ratings impact if a party that provides an essential service to a structured finance transaction fails to perform as contracted
Legal and regulatory	Reviewing the degree to which a securitization structure isolates the securitized assets from the bankruptcy or insolvency risk of entities that participate in the transaction

Source: S&P Global Ratings.

PROPOSED CHANGES FROM PREVIOUS CRITERIA

7. In this RFC we are proposing the following:

- A new approach for addressing elevated levels of country risk in trade receivable transactions.
- A change to our approach for analyzing the yield reserve element of the carrying cost reserve.
- A new approach that explains under what circumstances we may be able to rate single or concentrated obligor trade receivable pools.
- The introduction of a minimum credit enhancement requirement in addition to the existing pool-specific concentration floor.

We also provide more details about our considerations for fixed enhancement structures than the current criteria.

IMPACT ON OUTSTANDING RATINGS

8. We expect the proposed criteria, if adopted, to have no impact on any of our outstanding structured finance ratings for term trade receivables, or on our liquidity enhanced credit analysis (LECA) for trade receivable pools in partially supported ABCP conduits. One transaction currently

rated using the trade receivables criteria will fall outside the scope of these proposed trade receivables criteria, once adopted, and will instead be rated under criteria applicable for consumer assets. We do not expect this to impact the current ratings.

KEY PUBLICATION INFORMATION

- Publication date: March 23, 2021
- Response deadline: April 26, 2021
- Effective date: These proposed criteria will become effective upon publication of the final criteria, except in jurisdictions that require local registration. In those jurisdictions, the criteria will be effective only after the local registration process is completed.
- If adopted, these proposed criteria will fully supersede the articles listed in the Related Publications section near the end of this article.

QUESTIONS

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

- What are your views on the proposed global trade receivables methodology we have outlined in this article?
- Are there any other factors you believe should be considered in these proposed criteria that are not already noted in this article?
- What are your views on the new approach for country risk set out in these proposed criteria?
- What are your views on the minimum credit enhancement requirement set out in these proposed criteria?
- What are your views on the new approach for analyzing the yield reserve element of the carrying cost reserve?

RESPONSE DEADLINE

10. We encourage interested market participants to submit their written comments on the proposed criteria by April 26, 2021, to http://www.standardandpoors.com/en_US/web/guest/ratings/rfc, where participants must choose from the list of available Requests For Comment links to launch the upload process (you may need to log in or register first). We will review and take such comments into consideration before publishing our definitive criteria once the comment period is over. S&P Global Ratings, in concurrence with regulatory standards, will receive and post comments made during the comment period to www.standardandpoors.com/en_US/web/guest/ratings/ratings-criteria/-/articles/criteria/requests-for-comment/filter/all#rfc. Comments may also be sent to CriteriaComments@spglobal.com should participants encounter technical difficulties. All comments must be published, but those providing comments may choose to have their remarks published anonymously, or they may identify themselves. Generally, we

publish comments in their entirety, except when the full text, in our view, would be unsuitable for reasons of tone or substance.

PROPOSED METHODOLOGY

11. When analyzing trade receivable transactions, we first consider the characteristics of the originator seller-servicer and its industry. Then we consider three main risks in relation to the underlying portfolio: (1) default risk, including concentration risk; (2) dilution risk; and (3) negative carry. We also consider the impact of structural features such as stop purchasing triggers and eligibility conditions as well as commingling risk. The proposed criteria set out a formula-based approach for sizing credit enhancement to cover the three key risks.

12. Due to the short-term nature of the assets, trade receivables are usually purchased into revolving structures. The proposed criteria framework is based on the assumption that during the revolving period, a stop purchase trigger is breached and the pool pays down; the triggers could be breached for a number of reasons, including a seller-servicer insolvency. The level of credit enhancement in place when the trigger is breached must be sufficient to cover for any difficulty in collections that could result from a seller-servicer insolvency. In addition to covering for obligor defaults and dilutions, we also consider negative carry together with any structural mitigants, like a carrying cost reserve.

13. To ensure that sufficient credit enhancement is available to cover the key risks, many transactions have dynamic credit enhancement reserves that adjust to evolving pool performance (dynamic structures); others rely on fixed enhancement levels that have been sized to account for potential future evolutions of the pool performance (fixed structures). We apply our formula-driven approach to assess credit enhancement levels for both types of structures. In this article, we begin with the formula for dynamic enhancement structures, but we also explain how the formula can be used for fixed enhancement structures (see Appendix II for worked examples of the formula).

14. For dynamic structures, we will assess transaction-specific dynamic credit reserve formulas. We expect that the formula will address the risk of deteriorating credit quality of the securitized assets during the revolving period. We generally expect to see a dynamic credit reserve that is the greater of (a) the loss reserve plus the dilution reserve and (b) the loss reserve floor.

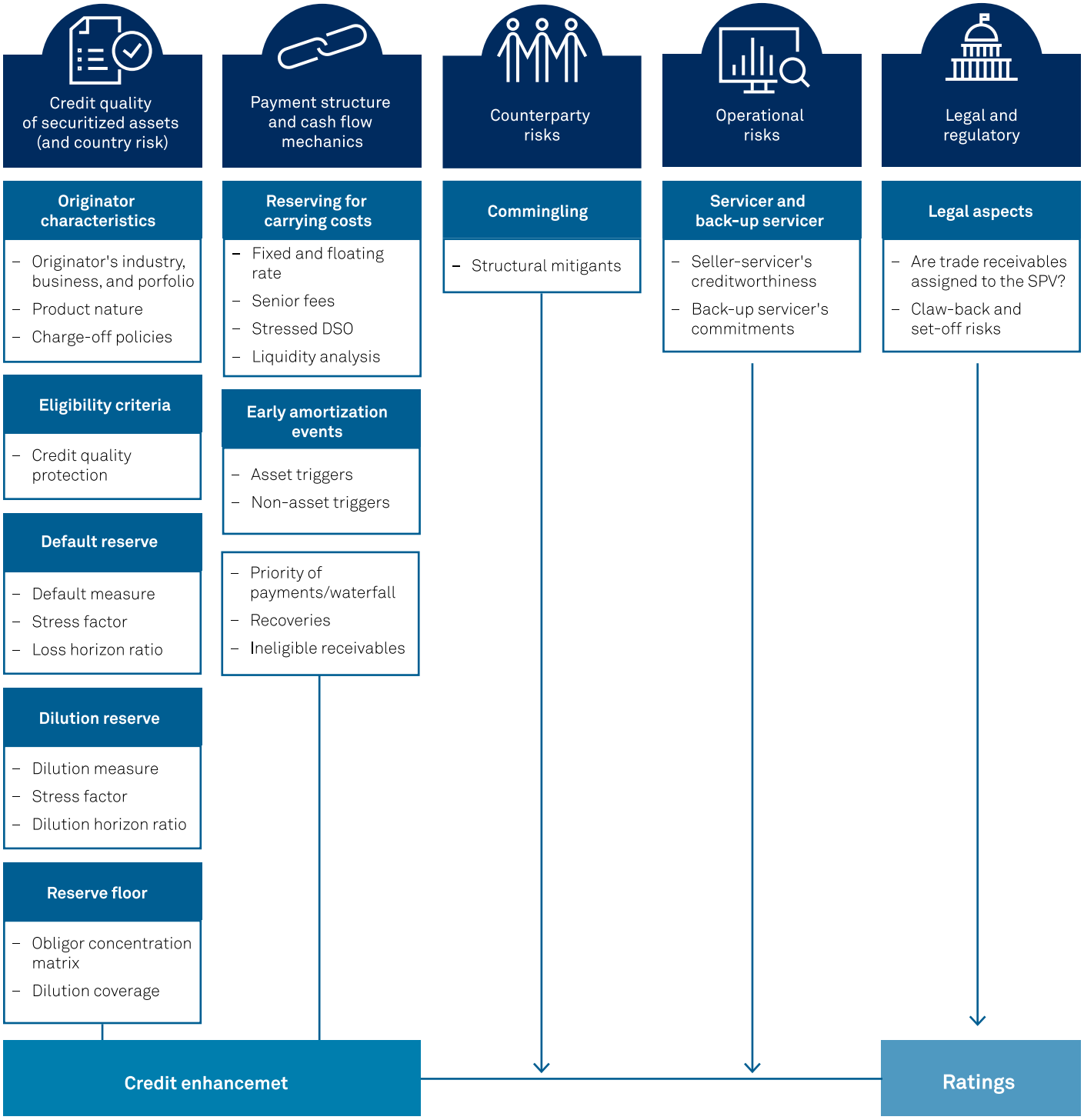
15. For fixed enhancement structures, we will assess the extent to which fixed levels of credit enhancement cover for the same risks by determining the appropriate base case and stress factors, having considered historical performance and transaction-specific performance-based triggers and other structural features in our forward-looking analysis of default and dilution.

16. For both fixed and dynamic enhancement structures, we consider whether levels of enhancement are sufficient to cover negative carry and commingling, and we will tailor our analysis to account for additional risks, including country risk, industry risk, seller-servicer risk, and the terms of the receivables.

17. When analyzing operational risk for trade receivable transactions, we give consideration to the creditworthiness and franchise value of the seller-servicer, among other things, when assessing the likelihood of a material disruption in its services. This may constrain the rating of the notes, as set out in our structured finance operational risk criteria (see Related Criteria section). Given the importance of the seller-servicer in trade receivable transactions, for any potential investment-grade rating, we will look to the rating of the seller-servicer when assessing a transaction's operating condition. For unrated seller-servicers, we may use a credit estimate or a credit assessment to assess their creditworthiness. For seller-servicers that we do not view as having a stable operating condition, we may apply a lower rating than the maximum potential

rating determined under our operational risk criteria. Furthermore, given our view of the importance of the seller-servicer, we will limit any uplift to the maximum potential rating for back-up servicer provisions in trade receivable transactions, typically to no more than two notches.

Overview Of Trade Receivables Framework



Source: S&P Global Ratings.

Originator Characteristics

Our first step in the analysis of performance risk and corresponding enhancement levels is a review of the originator (usually also the seller and servicer), its underwriting and collection policies and procedures, customer demographics, marketing strategies, terms offered to customers, the nature of competition, and industry-specific factors (we set out our typical review considerations in Appendix I). Performance characteristics can vary widely across different industries, as well as across different companies within the same industry. These factors can affect receivables behavior and, in turn, can have an impact on our assessment of default and dilution risk for both dynamic and fixed enhancement structures. We also consider these factors in our surveillance of ratings, as a change in company direction or industry practice can significantly affect default or dilution risk.

Calculating Credit Enhancement

19. Our review of the originator is the starting input into the assessment of the levels of credit enhancement provided by a dynamic reserve structure, where we look to our performance-based credit reserve formula. The following sections explain the various components of this formula and detail the key factors that can lead to adjustments, starting with the loss reserve. A complete worked example has been included in Appendix II.

Credit Reserve
= Greater of (a. loss reserve + dilution reserve) and b. reserve floor

Reserving For Obligor Default Risk--Loss Reserve

20. The first element of the transaction-specific reserve formula that the proposed framework considers is the loss reserve--specifically, the extent to which the loss reserve put in place accounts for default risk (the risk of the obligors not paying or paying late). Transaction documentation typically defines specific late-stage delinquencies (e.g., 90 days past due) as a proxy for default.

21. The loss reserve formula multiplies variables referred to as: "the loss ratio," "the loss horizon ratio," and "the stress factor."

Loss Reserve					
=	Loss ratio	×	Loss horizon ratio	×	Stress factor

22. In long form, the entire loss reserve formula can be displayed as follows.

Loss Reserve Formula					
	Loss Ratio		Loss Horizon Ratio		Benchmark Stress Factor
=	Highest three-month rolling average of the default ratio over the prior 12 months	×	Cumulative sales in the loss horizon divided by the current net eligible receivables balance	×	AAA 2.50 AA 2.25 A 2.00 BBB 1.50 BB 1.30 B 1.10

Loss ratio

Default Ratio

23. The calculation of the loss ratio starts with a measure of credit quality that we refer to as "the default ratio." The default ratio is calculated by taking the transaction-defined proxy for default plus actual write-offs of eligible receivables according to the seller's credit and collection policy, divided by sales generating such proxy for default. For new issuance, we may use book data of eligible receivables as a proxy until the securitized pool has seasoned.

Default Ratio
$= \frac{\text{Proxy for defaults + actual write-offs}}{\text{Sales generating proxy for defaults}}$

24. The loss ratio is calculated as the highest three-month rolling average "default ratio" over the previous 12 months. Use of this loss ratio definition means that the loss reserve will quickly adjust for deteriorating portfolio performance but will require 12 months of strong performance to remove the effect of a single quarter's poor performance. Rolling averages also dampen the effect

of monthly aberrations.

Loss Ratio

= Highest three-month rolling average of the default ratio over the last 12 months

Loss horizon ratio

25. Key to understanding the purpose of the loss horizon ratio is that the loss ratio represents an estimate of losses as a percentage of the sales of only one vintage, whereas at any point in time, the receivables pool will likely include multiple vintages. This leads to the second variable, the loss horizon ratio. In simple terms, to calculate the total amount of losses likely to be experienced by an amortizing pool of more than one vintage, the estimated amount of losses for each vintage that is expected to constitute the amortizing pool at any point in time would need to be summed.

Loss Horizon Ratio

$$= \frac{\text{The cumulative sales in the loss horizon}}{\text{Current month's net eligible receivables balance}}$$

26. To determine how many vintages of sales are embedded in the pool, we will look to the date of delinquency after which a receivable will no longer be eligible for financing (i.e., the period from the invoice date to the date at which the receivable is no longer eligible). We refer to this time period as the "loss horizon." For example, if a receivable is not considered eligible after being 60-days delinquent and the company offers net 30-day payment terms, the loss horizon would be three months.

27. Once the number of vintages has been identified, the total cash amount of losses expected to be incurred during amortization is calculated by summing the product of the loss ratio multiplied by the sales for each of the vintages. Then the total cash amount of losses can be expressed as a percentage of the eligible receivables to determine the credit enhancement needed. In the loss reserve formula, the same calculation is achieved where the loss horizon ratio is multiplied by the loss ratio. The loss horizon ratio used in the loss reserve formula takes the cumulative amount of sales during the loss horizon and divides it by the current period's net eligible receivable amount.

28. When calculating the loss horizon to define the amount of sales embedded in the portfolio in the loss horizon ratio formula, it is important to understand how frequently the eligible receivables balance is monitored. If the eligible receivables balance is not monitored daily, but only monthly, another month would be added to the loss horizon. This is done because the intra-month

performance of the pool would not be known and, therefore, amortization events relating to the adequacy of reserves would not be triggered until the end of the month (rather than triggered on any day during the month when the settlement statements are prepared).

29. In our calculation of the loss horizon, we will also consider whether receivables are aged on a due-date basis rather than on an invoice-date basis. If the seller makes use of a variety of payment terms, a weighted average of the payment terms may be applied to modify the loss horizon. For instance, if the portfolio's weighted average payment term was 40 days, the numerator of the loss horizon ratio should be modified so that it includes three and one-third months of sales in the example above.

30. If transactions do not limit receivable payment terms or portfolio weighted average payment terms to a fixed number of days, a recalculation of the weighted average payment terms (and thus the loss horizon) on a monthly or quarterly basis would typically be expected.

31. When assessing the loss reserve in transactions with fixed levels of credit enhancement, we may not always employ the loss horizon ratio for the loss reserve. Instead we may use more conservative stress factors and more conservative loss ratios. In such cases, we would expect to receive data on the seasoning of each monthly vintage according to various delinquency cuts (e.g., over 30, 60, 90, 120 days past due). The loss ratio would then typically be defined as the highest three-month moving average within the chosen delinquency cut. We may apply adjustments (typically up to 30%) to the final loss ratio to reflect qualitative forward-looking factors that may not be fully reflected in the available historical performance data (for example, see Appendix III Brazilian trade receivable transactions).

32. When assessing the loss reserve for all structure types, we also consider any performance triggers that have been put in place to prevent deterioration of the credit quality of the pool beyond given levels (see section on Asset Performance Triggers towards the end of this RFC).

Stress factor

33. The table below sets forth our benchmark stress factors for each rating category, which we apply in our analysis to assess the sufficiency of credit enhancement. In our assessment we may adjust these stress factors upward or downward, depending on the specifics of a particular transaction, for example, seller, obligor, product nature, industry, country risk characteristics, and structural aspects (such as fixed vs dynamic enhancement).

Table 1

Benchmark Stress Factors

Rating category(i)	Benchmark stress (ii)
AAA	2.50
AA	2.25
A	2.00
BBB	1.50
BB	1.30
B	1.10

(i)In the application of a plus (+) or minus (-) sign to show relative standing within the rating categories, rating scenario benchmark stress factors for the 'AA' to 'B' rating categories are interpolated between categories. (ii)See table 11 in Appendix III for the benchmark stress factors used in Brazil.

34. Factors leading to upward adjustments may include: weak originator underwriting and track

record, excessive obligor concentration, aggressive originator growth strategy, and the short-term impact of weak macroeconomic expectations (this is separate from country risk adjustments). Conversely, we may lower the benchmark stress factors. Factors leading to downward adjustments may include: the portfolio showing extremely granular exposure, very strong incentives to pay, and a long history of stable performance.

35. In our assessment of the loss reserve, we may increase our stress factors further (in addition to any increases driven by the factors outlined above) in cases where we observe elevated levels of country risk, which is typically indicated by a country risk assessment of '4' or higher, according to our country risk criteria (see Related Criteria section). In such situations, we typically look to increase the stress factors by a factor of 1.1x-3.0x. The greater the risk of economic and political volatility, the higher the stress factor. For multijurisdictional pools, we may apply a weighted average factor based on the worst possible pool composition. This would depend on what limits to country exposure, if any, have been set out in the transaction documents. We may also adjust stress factors to account for the characteristics of a regional market--for example, increased volatility in some Brazilian trade receivable pools (see Appendix III).

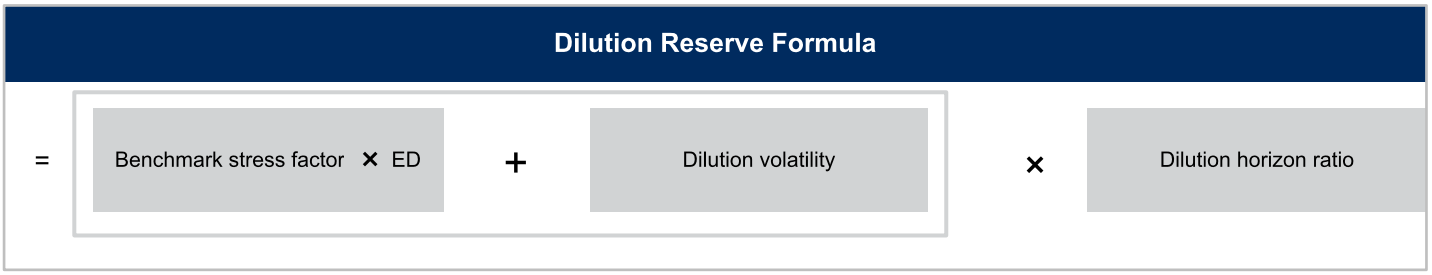
36. Our benchmark stress factors have been calibrated to account for the following:

- The short-term nature of the assets. Most trade receivable pools will turn over entirely in a short period of time and, as such, the length of time over which a transaction is exposed to credit and dilution risk is short. Therefore, we may apply higher stress factors where the securitized receivables have payment terms of more than 45 days.
- The dynamic nature of the reserves. Deviations in portfolio performance will be addressed each month during the life of the transaction. This is not the case for fixed enhancement structures, where higher stress factors may be applied.
- The inherent recoveries in each transaction. Inherent recoveries refer to collections on receivables that come in after the default horizon. These collections are difficult to quantify, but nonetheless will usually be passed through to noteholders according to the allocation mechanism stipulated in the transaction. As a result, we may apply higher stress factors if the investors do not benefit from the collection of recoveries.
- Collections from ineligible receivables. In the same manner as inherent recoveries, collections from receivables that become ineligible will be passed through. If this is not the case, we may adjust stress factors upward.

Reserving For Dilution Risk--Dilution Reserve

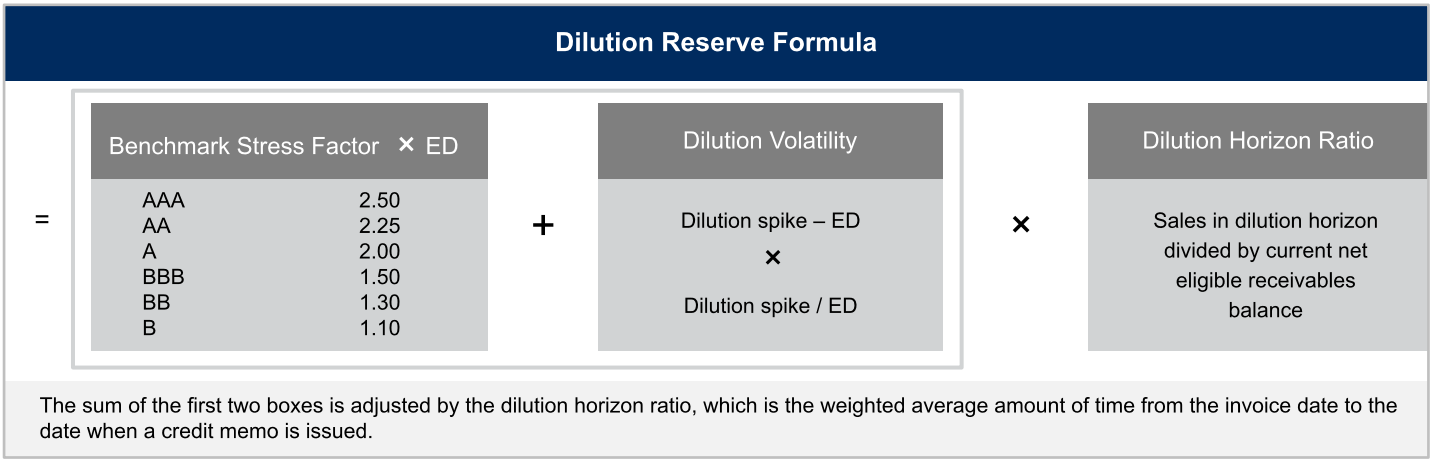
37. The second element of the transaction-specific reserve formula that the proposed framework considers is the dilution reserve. We assess the extent to which the transaction's credit enhancement covers for dilution risk--the risk of noncash reductions in the receivable balance for reasons other than default, such as product quality disputes or volume rebates. We employ a dilution reserve formula that applies a stress to the base or expected level of dilution, which will vary in time and amount. The credit enhancement calculation also incorporates dilution volatility above a base level of dilutions.

38. For dynamic transactions, we typically expect to receive confirmation whether checks issued on account of dilutive items are measured, as well as dilutive credit memos. This is because the payment of a check rather than the issuance of a credit memo may resolve certain dilutive items, such as volume rebates.



ED—Expected dilution.

39. The dilution reserve formula can be displayed in long form as follows.



ED—Expected dilution.

Stress factor multiplied by expected dilutions

40. The first component of our dilution reserve formula is the stress factor multiplied by expected dilutions. Adjustments for country risk will typically be applied to dilution reserve multiples in the same way in which they are for default reserve multiples, but the stress factors could differ. As with the loss reserve, we also typically apply a more severe stress factor in sizing dilution coverage for fixed enhancement structures.

41. The expected dilution measure is typically calculated as the rolling-12-month average of the dilution ratio. A 12-month rolling average is used to dampen monthly aberrations and to serve as a protective measure for dynamic reserve calculations.

Expected Dilution

= 12 month rolling average of the dilution ratio

42. **Dilution ratio** The dilution ratio is designed to measure expected dilutions. As is the case with defaults, the ratio tracks the amount of dilution back to its origin. Companies generally do not age their dilutive items relative to an invoice date. To address this issue, sellers may randomly sample credit memos and age them back to the original invoice. We typically use a weighted average of the time it took for the credit memo to be issued relative to the invoice date as the "dilution horizon." We generally expect to see periodic credit memo sampling, along with periodic recalculation of the dilution horizon.

Dilution Ratio

$$= \frac{\text{Dilution}}{\text{Sales generating such dilution}}$$

43. As with obligor default risk, dilution risk can be significantly affected by a change in company direction or industry practice. Our analysis of dilution risk includes (1) breaking down credit memos or similar instruments that represent dilutive items into different categories and (2) determining whether they can be contractually quantified or are variable. For example, if a company offers payment terms of 2/10 net 30, then it is known that a particular customer may take a 2% discount on its invoice if the customer pays within 10 days. This 2% dilutive item is clearly quantifiable and will never be greater than 2% (unless the company changes its payment terms). Therefore, with this quantifiable dilutive item, it is not necessary to stress this amount for purposes of credit support calculations, because it will never be any greater than 2%. On the other hand, returns due to product defect, while they may be predictable, are not contractually limited and, thus, are subject to stress for purposes of calculating credit support. Therefore, dilutive items that are contractually quantifiable can be reserved for separately, although in practice they are often included in transactions' dilution reserve calculations.

44. The dilution horizon is the time period between a sale and the recognition of a dilutive credit. Different types of dilution have different horizons. For example, cash discounts are predictable on the basis of the terms offered, but a defective product dispute may take months to resolve, depending on the nature of the product and the process for addressing the issue. We typically expect the determination of a dilution horizon to be derived through credit memo sampling and analysis. Factors that we will consider in assessing the adequacy of dilution samples include:

- The number of total credit memos versus the number sampled,

- Seasonality in company operations,
- Inclusiveness of the sample over time,
- Dilution type, and
- The credit processing location relative to the obligors (for pools that cover a very large geographic region or multijurisdictional pools).

45. In our surveillance of fixed credit enhancement structures, we may not need to recalculate the dilution horizon because, at closing, we typically assume the most conservative (i.e., longest) horizon based on documented transaction pool constraints--or longer based on historical data.

46. Once the dilution horizon is known, the dilution ratio can be calculated. This is done by following a similar approach to the calculation of the default ratio, so that dilutions are divided by the sales generating dilutions. For example, if there is a two-month dilution horizon, the current month's dilutions are divided by the monthly sales generated two months prior.

Dilution volatility

47. The second component of the formula is an additive amount that addresses proportionate deviations from the expected dilution measure. More specifically, it measures the dilution spike minus expected dilution and multiplies that amount by a factor that is defined by the ratio of the dilution spike over the expected dilutions.

Dilution Volatility			
=	(Dilution spike – Expected dilution)	×	$\frac{\text{Dilution spike}}{\text{Expected dilution}}$

48. In instances where there is more deviation from the expected level of dilution, the corresponding volatility component increases. This allows us to differentiate the level of enhancement necessary for portfolios exhibiting low volatility relative to portfolios with higher volatility.

49. **Dilution spike** The dilution spike captures the highest dilution ratio over the prior 12-month period. For fixed structures, in certain instances where the receivables are exposed to significant and predictable dilution variation due to seasonality, we will consider the output of the dilution formula holistically. This may lead us to apply a spike that is less than the highest dilution ratio over the last 12 months.

Dilution horizon ratio

50. The third component of the dilution formula is the dilution horizon ratio, which serves the same purpose as the loss horizon ratio. It translates a monetary amount of dilution expected during amortization of a receivable portfolio into a receivables-based ratio. The dilution horizon ratio is calculated in the same fashion as the loss horizon ratio. The formula divides the cumulative sales over the dilution horizon by the current month's net eligible receivables.

Dilution Horizon Ratio
$= \frac{\text{Sales in dilution horizon}}{\text{Current net eligible receivables balance}}$

Reserve Floor

51. The final element of the dynamic credit reserve is the reserve floor. As described above, the credit reserve is the greater of (a) the loss reserve plus the dilution reserve and (b) the reserve floor.

52. The purpose of the reserve floor is to capture risks that may not be fully captured in the loss reserve and dilution reserve calculations outlined above. In addition to factors specific to each portfolio and seller, structural characteristics of the transaction (such as the dynamic support calculation, amortization event triggers, eligibility criteria, and frequency of compliance checks) will affect the evaluation of the reserve floor. In our assessment of dynamic and fixed enhancement structures, we expect that at a minimum, the reserve floor addresses the largest concentrations allowed in the transaction documents, as well as an anticipated level of dilutions.

Reserve Floor			
=	Concentration factor	+	Dilution ratio × Dilution horizon ratio

Concentration factor

53. The first component of the reserve floor is the concentration factor. This captures the likelihood that during amortization, a certain number of obligors will default, thus reducing cash flow to the securitization.

54. To address this risk, we look to see a reserve floor that covers the default of a minimum number of obligors and that varies as a function of the creditworthiness of the obligors and the rating scenario considered. The table below indicates the number of obligors that we expect to be reserved for in a transaction. The rating scenario considered (tranche rating) sits at the top of the table and the obligor ratings run along the left-hand side of the table. Given the parameters set forth in a given transaction structure, the minimum concentration coverage percentage will be the greatest single result produced by multiplying the number of concentrations required to be covered for each obligor rating and the allowable concentration percentage (which is usually defined in the transaction documents). The table assumes payment terms of 45 days or less and

we would typically increase coverage requirements for longer payment terms. For example, for 'AAA' or 'AA' category ratings, if receivable payment terms were for 12 months, we would typically increase coverage requirements from the largest five up to the largest nine unrated or non-investment-grade obligors.

Table 2

Minimum No. Of Obligors For Which A Transaction Must Reserve

Obligor rating	Transaction rating					
	AAA	AA	A	BBB	BB	B
A-1+	0	0	0	0	0	0
A-1	1	1	0	0	0	0
A-2	2	2	1	0	0	0
A-3	3	3	2	1	0	0
B	5	5	4	3	2	1
<B or and unrated	5	5	4	3	3	2

For Obligors that only have a long-term rating, see "Methodology For Linking Long-Term And Short-Term Ratings," April 7, 2017.

55. We typically do not make adjustments to account for industry concentration. We generally expect that obligors belonging to the same group are aggregated and the concentration limit in the eligibility criteria are per group rather than single obligor. We would expect that the reference rating used for concentration coverage would be the lowest issuer credit rating of single obligors belonging to the same group. In the event that an obligor in the group is unrated, we would review on a case by case basis (generally we would consider our group rating methodology or bank branch criteria as appropriate--see Related Criteria section).

56. In multi-seller factoring pools, we may treat the sellers (which are typically restricted by concentration limits) as the end obligors as an additional step in our concentration analysis. For diversified pools (at least 100 sellers), where there is recourse to the seller, we generally would not make positive adjustments based on the sellers' credit strength in our analysis of loss and dilution. In concentrated pools, however, we may consider positive adjustments for the sellers' credit strength.

57. The following theoretical example shows how the matrix works.

Assume a theoretical transaction has the following features:

- A senior tranche rated 'AAA', and
- The eligibility conditions in the transaction documents limit receivables from 'A-1+', 'A-1', 'A-2', 'A-3', and all non-investment-grade or unrated obligors to 10%, 8%, 6%, 3%, and 2%, respectively. Any exposures in excess of these limits will be considered ineligible for purposes of calculating the net eligible receivable balance.

Table 3

Example Of Concentration Factor

Calculation for 'AAA' (to be read in conjunction with table 2 above)

Matrix requirements for 'AAA' as per table 2	Example of documented maximum eligible concentration limits	Resulting concentration matrix obligor coverage requirements	Credit component to reserve floor uses the highest output below
Cover one 'A-1' obligor	8%	Cover of one obligor at 8% each	= 8%
Cover two 'A-2' obligors	6%	Cover of two obligors at 6% each	= 12%
Cover three 'A-3' obligors	3%	Cover of three obligors at 3% each	= 9%
Cover five 'B' obligors	2%	Cover five obligors at 2% each	= 10%
Cover five unrated obligors	2%	Cover five obligors at 2% each	= 10%

Note: The matrix requirements set out above are based on the assumption that the recivables' payment term is 45 days or less.

58. In this particular theoretical example, the above assumed concentration limits plus the given parameters result in a 12% minimum credit component to the reserve floor (being the highest amount derived from multiplying the number of obligors at any given level to be covered versus the transaction documented limits per obligor rating level).

59. There are a few important considerations when applying the concentration matrix to a transaction. First, the matrix serves only as a guideline and may be adjusted upward or downward based on the characteristics of the portfolio and the composition of the obligors making up the portfolio. Second, the matrix is intended for highly diversified portfolios with low historical loss experience and a small number of obligors that come close to or exceed the stipulated concentration limits. Additionally, concentration risk with respect to dilutions could also affect reserve floor calculations. Third, the guideline matrix does not account for elevated levels of country risk; where the risk is elevated, we typically assume higher credit reserve floor levels. Finally, we will always consider concentrations of obligors at all rating levels, including those of obligors rated the same as or higher than the potential tranche rating. If we feel that there are concentrations of obligors (or sellers in multi-seller factoring pools) that are not covered by the floor (because they are highly rated), we will consider the impact of the largest obligors potentially defaulting, and this may constrain the level of the ratings that can be assigned.

60. In the case of a pool that is not diversified, the matrix may be partially disregarded and more stringent criteria may be incorporated, which may include coverage of a given number of obligors (regardless of their creditworthiness). We may also apply a similar approach in cases of high geographical concentrations or potential extreme weather events in certain industries, like agricultural commodities. If the pool is highly concentrated, we may not be able to rate the transaction without certain mitigants (see the Concentrated-Obligor Pools section, below).

Dilution factor

61. The second component of the reserve floor is the dilution factor. The dilution component is the expected dilution measure multiplied by the dilution horizon ratio; both of these measures are calculated in the dilution reserve. The reserve floor is calculated as the sum of the concentration component of the reserve floor and the dilution component.

Minimum credit enhancement

62. In our view, there are limits to the predictability of trade receivables performance; as such, we expect that the credit reserve will be subject to a minimum amount. Our minimum credit enhancement levels at each rating category (expressed as a percentage of the current balance) typically range from 4% at 'AAA' to 0.8% at 'B' (see table below). We believe that a credit enhancement level below 4% creates vulnerabilities that are inconsistent with the degree of creditworthiness associated with a 'AAA' rating for the trade receivables ABS sector. For partially supported ABCP sellers where the ABCP noteholders are exposed to only a limited period of loss, the minimum floor will be applied on a case by case basis, depending on the length of this period.

Table 4

Minimum Credit Enhancement

Rating category	Typical minimum credit enhancement level as % of current balance*
AAA	4.0
AA	3.2
A	2.4
BBB	1.6
BB	1.2
B	0.8

*Would be interpolated to determine the rating-level (i.e., +/- modifiers) minimum credit enhancement.

63. Finally, the formula-driven approach will be supplemented with a review of additional factors relevant to the seller's business, industry, or portfolio. Some of these factors may act as mitigating factors, while others may add to a transaction's risk profile. As a result, they may respectively result in a decrease or an increase of the reserve amount commensurate with a given rating scenario.

Structural And Cash Flow Analysis

64. Structural features can have a significant impact on credit risks and may not only affect levels of credit enhancement, but also our ability to assign a rating. In addition to reserving for carrying costs, other structural features we consider are the revolving period, early amortization events, cash flow allocation provisions, and eligibility criteria. Our analysis of structural features in trade receivable transactions follows our global framework for payment structure and cash flow analysis (see Related Criteria section).

The carrying cost reserve

65. Trade receivables are typically non-interest-bearing assets. Therefore, in every trade receivables transaction, we consider the structural mitigants, such as a carrying cost reserve, to cover interest and fees, including servicing and trustee fees, which are expected to be incurred over an assumed amortization period and have to be paid either senior to, or pari passu with, payments to the rated notes. This is in addition to the credit enhancement that we look to see for defaults and dilutions. The exposure is typically determined as a function of the days sales outstanding (DSO), which is a common measure of receivable turnover. Our benchmark assumption for the length of the

stressed liquidation period is 2x the DSO. Important considerations in evaluating the adequacy of the carrying cost reserve are:

- The volatility and length of the DSO,
- The assumed loss horizon, and
- The frequency of investor interest payments.

Carrying Cost Reserve					
=	Senior costs	+	(Yield reserve	×	Notes balance)

Senior costs

66. We expect transactions to reserve for the higher of the current servicing fee (including back-up servicing fees), any agreed substitute servicing fee, or the market rate sufficient to attract a replacement servicer. This is important because in most transactions, the event of a servicer default that results in the replacement of the seller-servicer will prevent the reinvestment of collections into new receivables and trigger an early amortization, in addition to subjecting the transaction to higher servicing costs. We expect to see senior costs multiplied by a stressed amortization period (generally captured by 2x the DSO) divided by 360, and then sized to the pool balance.

Senior Costs						
=	(Servicing fees + Other senior costs)	×	$\frac{2 \times \text{Days sales outstanding}}{360}$	×	Pool balance	

Yield reserve

67. To quantify the interest exposure in a transaction with fixed-rate liabilities, the interest rate is multiplied by a stressed amortization period (as above) divided by 360 and, in the calculation of the carrying cost reserve, it is then multiplied by the principal amount of the SPE's liability. We would also consider the frequency of interest payments in our analysis of the yield reserve to ensure sufficient coverage to the next interest payment date.

Fixed Rate Notes Yield Reserve

$$= \text{Interest rate} \times \frac{2 \times \text{Days sales outstanding}}{360}$$

68. However, if the SPE is issuing floating-rate securities, the risk that the index may reset at a higher level during the amortization period needs to be quantified. This analysis will consider the following factors:

- The worst-case amortization period (generally the longest-dated receivable plus default definition),
- The maximum number of benchmark rate resets that will occur on the liability during the period in which the asset remains outstanding, and
- The historical volatility of the index over the maximum number of resets.

69. For a floating-rate transaction with plain vanilla receivables and low country risk, if the interest rate risk is not fully mitigated, we would look to see a fixed margin of at least 200 basis points added to the interest rate index to address possible increases in the interest rate incurred over the course of the assumed amortization period. Where we observe elevated levels of country risk (typically a country risk assessment of '4' or higher) or where we observe payment terms much in excess of 45 days, a larger margin may be necessary. However, we may not increase the margin for country risk for indices that are not reflective of a given jurisdiction's economic volatility--for example, an index set by the European Economic and Monetary Union. Where reserves are higher than we would expect, excess credit enhancement (minimum available credit enhancement minus stressed losses and dilution) may provide cushion to interest rate volatility akin to a 200-basis-point margin.

Floating-Rate Notes Yield Reserve

$$= (\text{Index} + \text{spread} + \text{buffer}) \times \frac{2 \times \text{Days sales outstanding}}{360}$$

70. For fixed enhancement structures in jurisdictions exposed to volatile interest rate benchmarks (typically with a country risk assessment of '4' or higher), we may apply a stressed base interest rate curve to derive the minimum expected coverage for the note interest rates commensurate with the rating scenario. For example, where assets have a particularly long term (e.g., six months) and notes have a floating-rate coupon linked to the local base interest rate, we would look at the worst six-month interest rate movement for that index in a given rating scenario, according to our stressed interest rate criteria. For base rates, we would use our stressed interest rate criteria (see Related Criteria section) and consider that in assessing the size of the interest reserve provided.

Form of carrying cost reserve

71. One additional consideration regarding the carrying cost reserve relates to the form in which the carrying costs are provided. Typically, we expect to see part of the carrying cost reserve covered by a liquid source of payment (such as cash or a liquidity facility), sized to cover senior expenses and interest on the rated notes over the expected time to liquidation (i.e., DSO). The actual size of the liquid source of funds is a function of the inherent liquidity of the underlying receivables (represented by the DSO and the DSO volatility), the payment frequency of the securities, and other portfolio or structure-related features such as mitigants for commingling risk. If the DSO's volatility is high, the liquid source of funds needs to be enough to cover the cost of the structure over the highest historical DSO. If payments are intra-month, relatively more cash is required to cover any short-term liquidity risk. Conversely, if the portfolio has significant inherent liquidity (i.e., high turnover relative to other trade receivable portfolios), the amount of reserve that must be held in cash generally will be a small percentage of the reserve. We also consider other factors, such as whether payments are made directly to the issuer account, as well as the length of and the volatility of the DSO observed in the historical DSO information.

72. In most transactions, credit enhancement is primarily provided via subordination, and the carrying cost reserve is partly funded via a liquid source of funds and partly by the discount rate. In most fixed enhancement transactions, a minimum discount rate is typically sized at closing, and usually not adjusted over the life of the transaction. Where we believe that the minimum discount rate (together with any liquid portion) does not provide sufficient coverage of the transaction's carrying costs, we analyze whether the transaction benefits from other sources of support that may be used to make such payments in assessing the overall sufficiency of the carrying cost reserve. An example of such other sources of support is excess credit enhancement (typically, the excess of the minimum subordination over stressed reserves for loss and dilution).

Commingling

73. Commingling risk is the risk of loss of funds held by the servicer at the time of the servicers' insolvency, or any proceeds received by the servicer post their insolvency, that are not segregated from their insolvency estate or are held up as a result. Trade receivable portfolios exhibit higher rates of payment and turnover than other asset types, which means more funds could end up trapped in the servicer's accounts, and this could represent a large exposure to the securitized transaction. Our counterparty risk framework provides more detail of how we analyze commingling risk (see Related Criteria section). The key consideration for trade receivables is that commingling risk (either if it is a potential loss or a liquidity risk) can be material; therefore, absent any structural mitigants, it is likely to limit the potential transaction rating to no higher than the rating on the servicer.

Early amortization events

74. Early amortization events can protect a transaction's credit quality by discontinuing the reinvestment period if the pool's credit risk deteriorates beyond a certain point. Early amortization events and the related trigger levels help to inform the stressed assumptions applied in our rating scenarios.

75. We typically look for the following early amortization events.

Non-asset triggers:

- Bankruptcy of the seller or servicer.
- Material breach by the seller or servicer of representations, warranties, or covenants.
- Servicer default.
- Where relevant, seller-specific triggers, such as the sale of a significant subsidiary, which could affect the business and underwriting of the seller-servicer.

Asset performance triggers:

- Deterioration of portfolio performance beyond specified levels (typically delinquency, defaults, write-off, dilution, or DSO triggers). We review asset triggers, for both dynamic and fixed credit enhancement transactions. For fixed enhancement structures, if the level of the triggers are materially higher than our expected base case, we will likely raise our base case to at least as high as the trigger level. For dynamic enhancement structures, we may apply higher stress factors, unless mitigated by other structural features.
- Decline of credit enhancement to below specific levels commensurate with the notes' rating, or a borrowing base deficiency that is not cured within a specified period of time. Most trade receivable securitizations use a borrowing base concept. Typically, the borrowing base is calculated as eligible receivables minus reserves. The rated instruments are issued against the borrowing base, and investors are entitled to receive a percentage of collections equal to the investor amount over the borrowing base. This percentage is generally fixed upon the occurrence of an amortization event. The approach is designed to adequately allocate collections to investors and to ensure that stipulated reserves are maintained.
- Typically, a trigger limits the amount of cash standing in issuer bank accounts to avoid negative carry. When we assess that the trigger level creates additional negative carry risk, we will factor this into our analysis of the carrying cost reserve (unless mitigated by other structural features).

Cash flow allocation

76. We would also review if there is a structural mechanism prohibiting any release of cash flow for reinvestment or other purposes until there are enough eligible receivables plus available funds in the issuer accounts to enhance the transaction to the required levels, or early amortization is otherwise triggered.

77. When a senior/subordinated structure is used, the conditions under which any subordinate class is allowed to amortize are critical to our analysis. During a rapid amortization period, senior principal is typically paid down first. In most cases, given the short payment terms, more than half of the receivables pool would be expected to pay down in the first month of a liquidation scenario. If collections were released to the subordinated class (and not used to cover monthly defaults and dilutions), credit enhancement would evaporate quickly and not be available if needed in case defaults or dilutions materialize in later months. When a multiple-rated tranche structure is used, we consider the available credit enhancement for each rated tranche over the life of the transaction.

Eligibility criteria

78. Documented transaction eligibility criteria define the limits of possible pool composition. There is

usually a long list of documented eligibility requirements; the following are typically important to our analysis:

- Delinquent accounts. Borrowing-base calculations typically exclude receivables once they become past due beyond a specified delinquency category. These criteria assume that where credit enhancement is provided by assets, the assets are current or still have a reasonable likelihood of performing. Where eligibility criteria based on delinquency cut-off is used to ensure this, we will assess the documented cut-off date against historical data on aging performance and the originator's servicing procedures of delinquent receivables. If there is an absence of such a control or if we assess that the cut-off period is too long, we may not be able to assign a rating.
- Excess concentrations. To limit investor exposure to default by a large obligor, most structures set concentration limits on the basis of the credit rating of the obligor and the credit enhancement floor. This is analyzed in line with the reserve floor calculation discussed above.
- Multijurisdictional portfolios. To limit investor exposure to sovereign default and transfer and convertibility (T&C) risk, limits are set on allowable exposures to obligors in each country based on the sovereign rating and T&C assessment. Our analysis of sovereign risk in trade receivable transactions follows our sovereign risk in structured finance criteria (see Related Criteria section).
- Government obligors (including local government). The ability to assign government receivables may be limited by jurisdictional/local laws. Where government obligors are to be included, we would seek legal comfort to assess if the assignment would be valid. In addition, the government may be in a position to set off its obligations against amounts due from the receivable seller, such as tax, and this set-off risk can be material. Trade receivables to government-related obligors also tend to have longer payment terms than typical trade receivables to private companies, so they are typically limited. If the risk of set-off cannot be quantified or is not mitigated, we may not be able to assign a rating.
- Executory contracts. Receivables billed before completion of service or delivery of product are generally limited for two reasons. First, obligors are less likely to pay for a service or product that has not been received. Second, the receivable may be considered an executory contract that could be rejected by the seller upon its bankruptcy. If executory contracts are included in the pool, but their risks are not mitigated, we may not be able to apply this criteria.
- Bill-and-hold receivables. It is not unusual for a supplier to provide warehousing for certain customers. In such cases, the supplier sells the goods to the customer, but holds the inventory until the customer needs it. In the event of a bankruptcy of the supplier, the customer may attempt to stop payment on products that have not been shipped. In addition, collecting payment on other shipments to the customer may be difficult if there is bill-and-hold inventory that has been paid for, but is not in the possession of the customer. A number of legal and practical issues must be analyzed when bill-and-hold receivables are securitized. When bill-and-hold receivables have been included in trade receivable pools, they have been limited to a small percentage of the pool to minimize exposure. If the risk associated with such receivables cannot be mitigated, we may not be able to rate the transaction.
- Limitation of maximum and average payment invoice terms. If limitations are significantly higher than historical receivables pools, we may adjust our assumptions to account for longer invoice terms.
- Exclusion of current receivables due from obligors who show significant delinquencies on other receivables (cross default).

- Exclusion of receivables subject to dispute, offset, or counterclaim. This would typically also include an exclusion of any obligors with contra accounts with the seller-servicer; in the absence of such an exclusion, if the potential offset risk were not mitigated, we may not be able to rate the transaction. A contra account is an example of a dilutive item that may not be taken as an adjustment in the normal course of business, but nonetheless represents a potential future offset. A contra account is an account payable to, and account receivable with, the same payee-payor, which would, in most instances, not manifest itself as a dilution until the seller becomes bankrupt. Upon bankruptcy, an obligor may decide to net its payable position against its receivable position when making payment on the receivables to the seller, thus reducing the expected cash flow from receivables.
- The last allowable purchase date of receivables leaves enough time before the legal maturity of the notes such that all expected collections flow in on time to repay notes. Any lack of collections may be mitigated by principal reserves or other structural enhancements.

Additional Considerations

Concentrated-obligor pools

79. The issuer credit rating (ICR) on an obligor only addresses financial obligations, but these generally exclude trade credit obligations. This means that it is possible for an obligor to meet all its financial obligations while defaulting on a trade credit obligation. As such, we typically are not able to weak-link the rating of the transaction to the ICR of a single obligor. However, in instances where the transaction documentation substantially changes the nature of the obligation such that it is akin to a financial obligation--where a failure to pay the trade obligation would typically lead to the obligor ICR falling to 'SD' (selective default)--we may be able to link the credit risk of the pool to the ICR of the single obligor. Such structures are often associated with supply chain financing transactions. If the obligor were to guarantee payment of the rated notes, we would look to our guarantee criteria (see Related Criteria section).

80. In order to determine if the nature of the obligation has been changed to something more akin to debt, we would typically look to see that:

- The obligor is part of the transaction (i.e., party to transaction documentation and bylaws, and therefore have knowledge that nonpayment will lead to a financial obligation default and reputational damage).
- The obligor has committed to pay receivables fully and without dilutions according to a specific time frame, irrevocably and irreversibly.
- Legal opinions support the conclusion that the trade receivable obligations would be paid pari passu with the senior unsecured debt of the obligor in an insolvency situation.

81. If a transaction was exposed to a small number of obligors (i.e., very concentrated), we would typically look for the same features and then rate to the weakest link.

Factoring

82. In factoring transactions, there are important analytical considerations that relate to the levels of recourse and legal framework. Factoring exists in two main forms: factoring without recourse and factoring with recourse. In factoring without recourse, the factoring company bears the entire

credit risk of the receivables and has no claim against the entities from which the receivables were acquired in the event of an underlying obligor's failure to pay. In factoring with recourse, the factoring company does not bear the entire credit risk of the receivables and retains a claim against the entities from which the receivables were acquired in the event of an underlying obligor's failure to pay. In transactions where the factored receivables being securitized are "with recourse," we typically still focus on obligor performance, and we generally would not make positive adjustments based on the credit strength of the entities from which the factor acquired the receivables, because they are typically unrated and we assume they are insolvent in our stress scenarios.

83. For the avoidance of doubt, the application of our legal criteria to transactions involving factored receivables includes an assessment of the extent to which the securitization structure isolates the receivables from not only the factoring company's bankruptcy/insolvency risk, but also the bankruptcy/insolvency risk of the entities from which the factoring company acquired the receivables.

Long-term contract set-off

84. For trade receivable pools that include long-term contracts containing specific performance obligations to be met by the seller/originator, if the underlying form of contract or the actual contracts do not contain an affirmative waiver of set-off, then in our view, additional credit enhancement may mitigate set-off risk. When analyzing the set-off risk, we take into account the relative concentration of obligors in the total pool. To the extent we believe it is unlikely that all long-term contract obligors in a given trade receivable pool will seek to set-off, it may be sufficient for the issuer to size credit enhancement to cover only a limited number of the largest obligor concentrations in the pool. We will assess the appropriate scale of obligor coverage on a case-by-case basis, taking into account the specific characteristics of the transaction in light of the rating scenario considered. Our legal criteria concerning asset isolation and special-purpose entities (see Related Criteria section) set out additional jurisdictional considerations relating to long-term contracts.

85. If, in our view, set-off risk is not satisfactorily addressed by credit enhancement or other mitigating factors consistent with the rating, then our rating would typically be constrained by the rating on the seller/originator.

Credit insurance and asset guarantees

86. Sellers may have entered into credit insurance policies or asset guarantees in case of obligors' nonpayment of trade receivables beyond a certain payment term. Generally, we would not give credit to insurance due to concerns about timeliness of payment. However, we may account for this according to our mortgage insurance and guarantee criteria (see Related Criteria section) if credit insurance is transferrable to the issuer for the benefit of security holders and the insurance companies are rated by us.

87. We will consider giving credit to trade credit insurance depending on the nature of the trade receivables, details of the insurance policies and their payment terms, the credit quality of the insurance provider and their previous claims-paying experience, and the structural mechanism presented to us. We will take into account the dynamic nature of the required credit enhancement or, for fixed enhancement structures, the available credit enhancement. Providing benefit to insurance policies could result in lower credit enhancement levels in our analysis.

88. In assessing the potential for claims reduction or rejection, we would consider if the insurance is

provided at a pool level or at a loan level, in addition to previous claims-paying experience. For example, if there is only one insurance policy covering all the receivables, we believe there is an elevated risk of contract dispute, potentially resulting in all receivables losing the benefit of insurance. However, insurance at a loan level that diversifies the number of policies or insurers could mitigate this risk.

89. Any claims paid under trade credit insurance policies represent recoveries. Given the short-term and non-interest-bearing nature of trade receivables, the timeliness of claims payment is a material consideration because it can affect the investors' exposure to negative carry during the amortization period. To assess the scale of this exposure, we consider the payment terms under the policy, historical claims-paying experience, relevant regulatory requirements or legal precedent that may support timely payment of claims, and structural elements such as diversification of insurers and policies (our ratings definitions article provides further information on this--see Related Research section). In the unlikely event that insurance premiums are paid ongoing by the issuer (and not upfront by the seller), we would expect the premium to be covered in the carrying cost reserve from a liquid source.

Audit

90. We look to see if there are initial and ongoing periodic audits by a third party to verify compliance of trade receivables with eligibility criteria; in the absence of such an arrangement, we may not be able to assign a rating.

Surveillance

91. In terms of our surveillance, for fixed enhancement structures, we periodically update our default and dilution assessments based on new data. If performance deteriorates to a level worse than expected, or our forward-looking view changes, or we become aware of material changes to the originators' business model, we may update our default ratio, depending on structural features (like performance-based triggers), and this could lead to a change in ratings. We may also change our ratings if we observe several years (typically three or more) of continuously improved performance and other structural mechanisms in place.

92. For all structures, we monitor performance. For dynamic structures, should we observe volatility or believe that levels of defaults and dilutions are subject to significant change, we may adjust our analysis (e.g., apply higher multiples), which could lead to the lowering of ratings. We also will reflect on any significant changes to the originator's business model, underwriting criteria or policies if we believe that there may be a material impact on portfolio performance.

93. Finally, for both dynamic and fixed enhancement structures, in accordance with our operational risk criteria (see Related Criteria section), if the creditworthiness of the seller-servicer is subject to severe deterioration, this may raise the likelihood of a severe disruption in its services and could lead us to lower ratings.

Appendix I: Examples Of Seller Review Considerations

94. We consider the following when conducting a seller review:

- The seller's business, including financial performance, organizational structure, background, history, and recent significant developments;
- The seller's competition, including market share statistics and prospects for the future;

- Credit and collection policies, including an overview of the credit department, experience of credit personnel, procedures for granting new credit, aging policy, special programs, return policies, collection procedures, and write-off policies;
- Management of the portfolio;
- Receivable and invoice generation, including a detailed explanation of the billing cycle and the interaction with the receivable system (supported by documentation including standard agreements, standard bills of lading, purchase orders, and sales invoices);
- Receivables reserves and bad-debt write-offs;
- Dilution review, including a detailed description of the causes of dilution and any reserves established for dilution (supported by appropriate documentation);
- Dilution horizon analysis in both an anecdotal and statistical manner;
- Cash management;
- Concentrations and management of concentrations;
- Receivable performance statistics;
- Receivables systems;
- Disaster-recovery procedures; and
- Proposed changes to the systems.

Appendix II: Worked Examples

Loss horizon ratio example

95. The following example describes, in numerical terms, how the loss reserve (before applying the benchmark stress factor) is calculated, following two different methods. It also illustrates how the loss horizon ratio translates losses as a percentage of the sales of only one vintage (the loss ratio) into the estimated amount of losses of an amortizing pool, which includes multiple vintages.

Assumptions:

- 30-day payment terms;
- After 60 days past due, a receivable is no longer eligible; therefore, there is a three-month loss horizon;
- Receivables 61-90 days past due are deemed as defaulted, together with actual write-offs prior to 61–90 days.

96. In the example (see charts below), the three-month rolling average of the default ratio is 4.44% as of June, which we assume is also the peak of the three-month rolling average default ratio over the past 12 months (i.e., the loss ratio). The loss horizon ratio is equal to 3.08 and is the sum of generating sales (75 + 75 + 75 = 225) divided by the eligible portfolio balance (53 + 15 + 5 = 73). Following the formula, the loss reserve (before applying the benchmark stress factor) is the loss ratio multiplied by the loss horizon ratio, which is equal to 13.7% (4.44% x 3.08).

Sales-Based Default Ratio: Example

		Eligible receivables			Ineligible
			Days past due		Defaulted
Static pool	Sales	Current	1 - 30	31 - 60	61 - 90
June					2
May				5	5
April			15	5	3
March #3	75 →	53	15	5	
February #2	75 →	53	15		
January #1	75 →	53			

Default ratio

2/75 = 2.67%

5/75 = 6.67%

3/75 = 4.00%

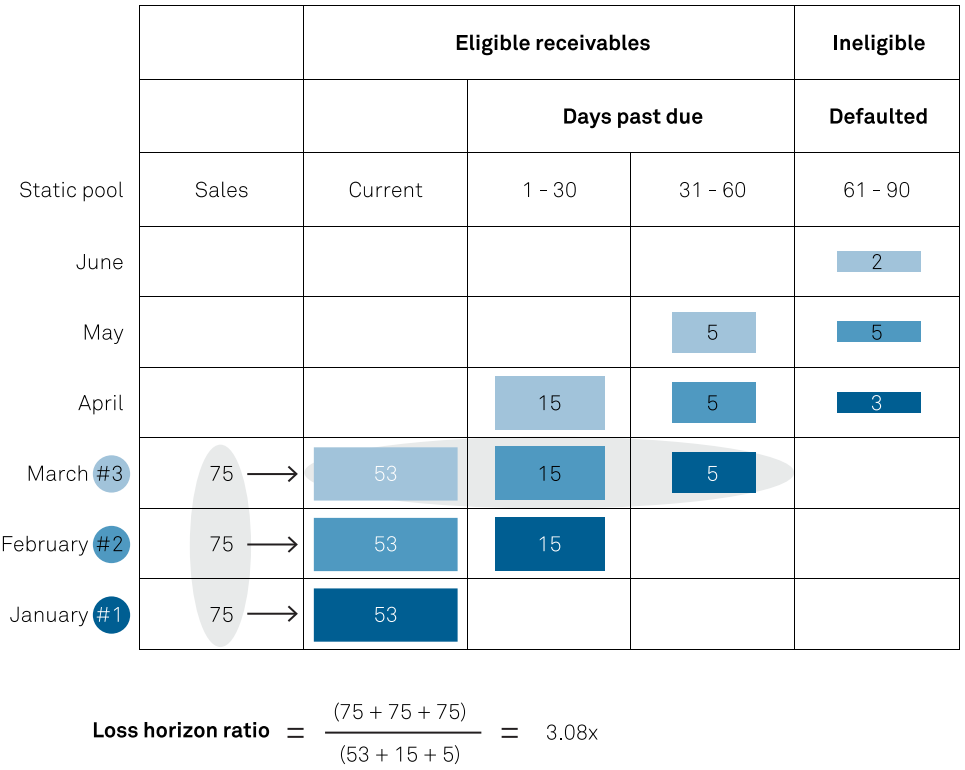
Loss ratio
(12-month peak of 3-month rolling average default ratio)

Assumptions

Payment terms = 30 days
Deemed default = 61-90 days past due

$$\textbf{Monthy default ratio} = \frac{\text{61-90 days past due + actual write-offs prior to 61-90 days past due}}{\text{Sales 3 months prior (t-3)}}$$

Loss Horizon Ratio: Example



Source: S&P Global Ratings.

97. A more intuitive but longer calculation achieves the same outcome. Here the loss ratio (4.44% in our example) is multiplied by the sum of generating sales (75 + 75 + 75 = 225). The result is 10.0 and represents the expected loss amount. If we divide 10.0 by the eligible portfolio balance (53 + 15 + 5 = 73), we get the expected losses as a percentage of the actual eligible portfolio. This percentage is still 13.7% (10.0 / 73 = 13.7%) and represents the loss reserve before applying the rating-dependent stress factors.

Dilution ratio and expected dilution example

98. The table below shows an example of expected dilutions and dilution spikes. The spikes of 5.4% and 5.3% assume that there is a one-month dilution horizon. However, if the dilution horizon is two months, the dilution spike will be calculated as the highest two-month rolling average of the dilution ratios over the previous 12 months.

Table 5

Dilution Ratio Statistics

Date	Dilution ratio (%)	12-mo. rolling avg. (%)	Expected dilution (%)	Dilution spike (%)
June 30, Yr. 2	5.4	4.9	4.9	5.4
May 31, Yr. 2	5.0	4.8	4.8	5.3
April 30, Yr. 2	5.0	N.A.	N.A.	N.A.

Table 5

Dilution Ratio Statistics (cont.)

Date	Dilution ratio (%)	12-mo. rolling avg. (%)	Expected dilution (%)	Dilution spike (%)
March 31, Yr. 2	4.9	N.A.	N.A.	N.A.
Feb. 28, Yr. 2	4.4	N.A.	N.A.	N.A.
Jan. 31, Yr. 2	4.6	N.A.	N.A.	N.A.
Dec. 31, Yr. 1	5.3	N.A.	N.A.	N.A.
Nov. 30, Yr. 1	5.2	N.A.	N.A.	N.A.
Oct. 31, Yr. 1	4.7	N.A.	N.A.	N.A.
Sept. 30, Yr. 1	4.9	N.A.	N.A.	N.A.
Aug. 31, Yr. 1	5.1	N.A.	N.A.	N.A.
July 31, Yr. 1	4.2	N.A.	N.A.	N.A.
June 30, Yr. 1	4.3	N.A.	N.A.	N.A.

N.A.--Not available.

Worked example of loss reserve

99. This example (as well as the examples in the sections that follow) focuses on a single component of the reserve and how it contributes to the reserve. We assume we are in a 'AAA' rating scenario (i.e., we may apply a stress factor of 2.5x) and that the reserve is calculated monthly.

Assumptions:

- 30-day payment terms;
- After 60 days past due, a receivable is no longer eligible; therefore, there is a three-month loss horizon;
- Receivables 61-90 days past due are deemed as defaulted;
- Monthly sales are always $100; and
- Daily monitoring.

100. In the following table, we show the typical monthly calculation of loss reserve.

Table 6a

Calculation Of Loss Reserve At 'AAA' Rating Level

Date	Eligible rec. ($) (a)	Sales ($)	Deemed defaults (61-90 days past due) ($)	Default ratio (defaults/sales--3 months before) (%)	3-month rolling avg of default ratio (%)	Loss ratio--greatest 3-month rolling avg over LTM (%)	Last 3 months' cumulative sales ($)	Loss horizon ratio	Stress factor (x)	Loss reserve* (%)
Dec. Yr. 2	120	100	2.3	2.3	2.2	2.2	300	2.50	2.50	14.0

Table 6a

Calculation Of Loss Reserve At 'AAA' Rating Level (cont.)

Date	Eligible rec. ($) (a)	Sales ($)	Deemed defaults (61-90 days past due) ($)	Default ratio (defaults/sales--3 months before) (%)	3-month rolling avg of default ratio (%)	Loss ratio--greatest 3-month rolling avg over LTM (%)	Last 3 months' cumulative sales ($)	Loss horizon ratio	Stress factor (x)	Loss reserve* (%)
Nov. Yr. 2	128	100	2.2	2.2	2.2	2.2	300	2.34	2.50	12.9
Oct. Yr. 2	115	100	2.2	2.2	2.2	2.2	300	2.61	2.50	14.3
Sept. Yr. 2	119	100	2.1	2.1	2.1	2.2	300	2.52	2.50	13.9
Aug. Yr. 2	118	100	2.3	2.3	2.1	2.2	300	2.54	2.50	14.0
July Yr. 2	125	100	1.9	1.9	2.0	2.2	300	2.40	2.50	13.2
June Yr. 2	130	100	2.2	2.2	2.0	2.2	300	2.31	2.50	12.7
May Yr. 2	115	100	2.0	2.0	1.9	2.2	300	2.61	2.50	14.3
Apr. Yr. 2	120	100	1.8	1.8	1.9	N.A.	300	2.50	2.50	N.A.
Mar. Yr. 2	119	100	1.9	1.9	2.0	N.A.	300	2.52	2.50	N.A.
Feb. Yr. 2	118	100	2.0	2.0	2.2	N.A.	300	2.54	2.50	N.A.
Jan. Yr. 2	119	100	2.1	2.1	2.2	N.A.	300	2.52	2.50	N.A.
Dec. Yr. 1	130	100	2.5	2.5	2.2	N.A.	300	2.31	2.50	N.A.
Nov. Yr. 1	125	100	2.0	2.0	2.1	N.A.	300	2.40	2.50	N.A.
Oct. Yr. 1	120	100	2.1	2.1	2.2	N.A.	300	2.50	2.50	N.A.
Sept. Yr. 1	119	100	2.1	2.1	2.1	N.A.	300	2.52	2.50	N.A.
Aug. Yr. 1	118	100	2.4	2.4	2.1	N.A.	300	2.54	2.50	N.A.
July Yr. 1	126	100	1.9	1.9	2.1	N.A.	300	2.38	2.50	N.A.
June Yr. 1	125	100	2.1	2.1	2.1	N.A.	300	2.40	2.50	N.A.
May Yr. 1	127	100	2.3	2.3	N.A.	N.A.	300	2.36	2.50	N.A.

*The loss reserve is the loss ratio multiplied by the loss horizon ratio multiplied by the stress factor. LTM--Last 12 months. N.A.--Not available.

101. In addition, we have followed the more intuitive, but longer, calculation of the dynamic loss reserve, taking the expected peak loss amounts over the previous three months of sales (which are embedded in the eligible portfolio) divided by the eligible receivables. The results do not change, as reported in the below table. There might be some volatility in the levels of loss reserve values as a function of the historical performance (the loss ratio) and of the amount of sales embedded in the eligible portfolio (the loss horizon ratio).

Table 6b

Alternative Calculation Of Loss Reserve At 'AAA' Rating Level

Date	Eligible receivables ($)	Sales ($)	Loss ratio-- the greatest 3-month rolling avg over LTM (%)	Stress factor	Expected losses on last 3 months of sales/eligible receivables (%)(i)	Loss reserve (%)(ii)
Dec. Yr. 2	120	100	2.23	2.50	5.58	14.0
Nov. Yr. 2	128	100	2.20	2.50	5.16	12.9
Oct. Yr. 2	115	100	2.20	2.50	5.74	14.3
Sept. Yr. 2	119	100	2.20	2.50	5.55	13.9
Aug. Yr. 2	118	100	2.20	2.50	5.59	14.0
July Yr. 2	125	100	2.20	2.50	5.28	13.2
June Yr. 2	130	100	2.20	2.50	5.08	12.7
May Yr. 2	115	100	2.20	2.50	5.74	14.3
April Yr. 2	120	100	N.A.	2.50	N.A.	N.A.
March Yr. 2	119	100	N.A.	2.50	N.A.	N.A.

(i)Expected losses are the loss ratio multiplied by the sum of generating sales. For instance, in December of year two, the expected losses are 6.7 (2.23% x 100 x 3). Expected losses divided by eligible receivables equals 5.58% (6.7 / 120 = 5.58%). (ii)Loss reserve = stress factor x expected losses. LTM--Last 12 months. N.A.--Not available.

Worked example of dilution reserve

102. Similarly, we have calculated monthly dilution reserves. Dilution reserve values may change as a function of expected dilutions, dilution volatility, and the amount of sales generating dilutions embedded in the eligible receivables (the dilution horizon ratio). We assume we are in a 'AAA' rating scenario (i.e., we may apply a stress factor of 2.5x). In this example, volatility is low, thus limiting the level of dilution reserve relative to portfolios with similar expected dilutions but higher volatility.

Assumption:

- A dilution horizon of one month.

Table 7

Calculation Of Dilution Reserve At 'AAA' Rating Level

Date	Eligible rec. ($)	Sales ($)	Dilutions ($)	Dilution ratio (%)	Expected dilution--12-mo. rolling avg. (%)	Stress factor (x)	Dilution spike--LTM highest dilution ratio (%)	Volatility component (%)(i)	Dilution horizon ratio	Dilution reserve (%)(ii)
Dec. Yr. 2	120	100	4.6	4.6	4.8	2.5	5.4	0.7	0.83	10.6
Nov. Yr. 2	128	100	4.8	4.8	4.8	2.5	5.4	0.6	0.78	9.9
Oct. Yr. 2	115	100	4.8	4.8	4.8	2.5	5.4	0.7	0.87	11.0
Sept. Yr. 2	119	100	4.7	4.7	4.7	2.5	5.4	0.8	0.84	10.6
Aug. Yr. 2	118	100	4.6	4.6	4.7	2.5	5.4	0.7	0.85	10.7
July Yr. 2	125	100	4.7	4.7	4.8	2.5	5.4	0.7	0.80	10.1
June Yr. 2	130	100	5.4	5.4	4.8	2.5	5.4	0.7	0.77	9.7
May Yr. 2	115	100	4.9	4.9	4.8	2.5	5.4	0.7	0.87	11.0
April Yr. 2	120	100	5.1	5.1	4.8	2.5	5.4	0.7	0.83	10.5
March Yr. 2	119	100	4.8	4.8	4.8	2.5	5.4	0.7	0.84	10.6
Feb. Yr. 2	118	100	4.5	4.5	4.8	2.5	5.4	0.7	0.85	10.7
Jan. Yr. 2	119	100	4.8	4.8	4.8	2.5	5.4	0.7	0.84	10.6
Dec. Yr. 1	130	100	4.8	4.8	N.A.	2.5	N.A.	N.A.	0.77	N.A.
Nov. Yr. 1	125	100	4.2	4.2	N.A.	2.5	N.A.	N.A.	0.80	N.A.
Oct. Yr. 1	120	100	4.3	4.3	N.A.	2.5	N.A.	N.A.	0.83	N.A.
Sept. Yr. 1	119	100	4.8	4.8	N.A.	2.5	N.A.	N.A.	0.84	N.A.
Aug. Yr. 1	118	100	4.9	4.9	N.A.	2.5	N.A.	N.A.	0.85	N.A.
July Yr. 1	126	100	4.8	4.8	N.A.	2.5	N.A.	N.A.	0.79	N.A.
June Yr. 1	125	100	5.4	5.4	N.A.	2.5	N.A.	N.A.	0.80	N.A.
May Yr. 1	127	100	4.8	4.8	N.A.	2.5	N.A.	N.A.	0.79	N.A.
April Yr. 1	118	100	5.1	5.1	N.A.	2.5	N.A.	N.A.	0.85	N.A.

Table 7

Calculation Of Dilution Reserve At 'AAA' Rating Level (cont.)

Date	Eligible rec. ($)	Sales ($)	Dilutions ($)	Dilution ratio (%)	Expected dilution--12-mo. rolling avg. (%)	Stress factor (x)	Dilution spike--LTM highest dilution ratio (%)	Volatility component (%)(i)	Dilution horizon ratio	Dilution reserve (%)(ii)
March Yr. 1	115	100	4.8	4.8	N.A.	2.5	N.A.	N.A.	0.87	N.A.
Feb. Yr. 1	118	100	4.5	4.5	N.A.	2.5	N.A.	N.A.	0.85	N.A.
Jan. Yr. 1	121	100	4.8	N.A.	N.A.	2.5	N.A.	N.A.	N.A.	N.A.

(i)Dilution volatility = (dilution spike - expected dilution) x (dilution spike / expected dilution). (ii)Dilution reserve = [(expected dilution x stress factor) + volatility component)] x dilution horizon ratio. LTM--Last 12 month. N.A.--Not available.

Worked example of reserve with floor

Assumption:

- Concentration coverage equal to 15%, assuming a maximum concentration coverage of 3% for each unrated obligor and a minimum coverage of the top five obligors at a 'AAA' rating level. We assume that 15% is the greatest single result produced by multiplying the number of concentrations required to be covered for each obligor rating at 'AAA'.
- The floor is the sum of the concentration coverage and expected dilutions multiplied by the dilution horizon ratio. For instance, in December of year two, the floor is equal to 19.0% (15% + 4.8% x 0.83).

Table 8

Calculation Of Credit Reserve At 'AAA' Rating Level

Date	Loss reserve (%)	Dilution reserve (%)	Concentration coverage (%)	Expected dilution (%)	Dilution horizon ratio	Reserve floor (%)(i)	Credit reserve (%)(ii)
Dec. Yr. 2	14.0	10.6	15	4.8	0.83	19.0	24.5
Nov. Yr. 2	12.9	9.9	15	4.8	0.78	18.8	22.8
Oct. Yr. 2	14.3	11.0	15	4.8	0.87	19.2	25.3
Sept. Yr. 2	13.9	10.6	15	4.7	0.84	19.0	24.4
Aug. Yr. 2	14.0	10.7	15	4.7	0.85	19.0	24.7
July Yr. 2	13.2	10.1	15	4.8	0.80	18.8	23.3
June Yr. 2	12.7	9.7	15	4.8	0.77	18.7	22.4

Table 8

Calculation Of Credit Reserve At 'AAA' Rating Level (cont.)

Date	Loss reserve (%)	Dilution reserve (%)	Concentration coverage (%)	Expected dilution (%)	Dilution horizon ratio	Reserve floor (%)(i)	Credit reserve (%)(ii)
May Yr. 2	14.3	11.0	15	4.8	0.87	19.2	25.3
Apr. Yr. 2	N.A.	10.5	15	4.8	0.83	19.0	N.A.
Mar. Yr. 2	N.A.	10.6	15	4.8	0.84	19.0	N.A.
Feb. Yr. 2	N.A.	10.7	15	4.8	0.85	19.0	N.A.
Jan. Yr. 2	N.A.	10.6	15	4.8	0.84	19.0	N.A.
Dec. Yr. 1	N.A.	N.A.	15	N.A.	0.77	N.A.	N.A.

(i)Reserve floor = concentration coverage + expected dilution x dilution horizon ratio. (ii)Credit reserve = the higher of (loss reserve + dilution reserve) and reserve floor. N.A.--Not available.

103. The credit reserve is equal to the higher of (a) the sum of the loss and dilution reserves and (b) the reserve floor.

104. In this example, the reserve floors never drive the loss and dilution reserves, which together are always greater than the reserve floor. For instance, in December of year two, the reserve floor of 19.0% does not drive the loss and dilution reserves, which together make 24.5%. Therefore 24.5% is the level of the credit reserve in December of year two.

Appendix III: Brazilian Trade Receivable Transactions

105. For Brazilian trade receivables, we typically apply an upward adjustment to the benchmark stress factors to reflect our view that jurisdiction-level risks and distinctive industry characteristics can increase volatility in pool performance. The pools of obligors in Brazilian trade receivable transactions are composed almost exclusively of unrated and very small businesses. Also, we apply higher stress factors for all rating categories and adjust according to the receivables term because we do not apply the loss horizon ratio when calculating the loss proxy in Brazil. As a result, we typically apply the following stress factor ranges for Brazilian trade receivables transactions shown in tables 9a and 9b.

Table 9a

Benchmark Stress Factor Matrix For Single Sellers

Global scale rating	Receivables weighted average payment term (days)			
	(Up to 30 days)	31 to 60 days	61 to 90 days	Over 91 days
BBB	2.1x-3.5x	2.7x-4.5x	3.5x-5.8x	4.5x-7.5x
BB	1.8x-3.0x	2.5x-4.0x	3.2x-5.2x	4.2x-6.7x
B	1.5x-2.5x	2.0x-3.3x	2.6x-4.3x	3.5x-5.5x

Table 9b

Benchmark Stress Factor Matrix For Multi-Sellers

	Receivables weighted average payment term (days)			
Global Scale Rating	**Up to 30 days**	**31 to 60 days**	**61 to 90 days**	**Over 91 days**
BBB	2.5x-4.0x	3.3x-5.5x	4.3x-7.0x	5.5x-9.0x
BB	2.2x-3.5x	3.0x-4.8x	3.8x-6.2x	5.0x-8.0x
B	1.8x-3.0x	2.5x-4.0x	3.0x-5.0x	4.2x-6.5x

106. Given constraints associated with the sovereign rating cap, the tables only provide stress factors for certain rating categories. Stress factors for the high and low end of each rating category (e.g., 'B+' and 'BB-') may be set through linear interpolation. We may build on these stress factors to further adjust for national scale ratings (also through a straight-line interpolation).

107. We expect to apply these factors for both loss and dilution stresses. The above factors are not absolute, but rather starting points for our analysis. We may further adjust the stress factors to reflect specific pool characteristics, such as unusually short or long receivable terms. Also, under certain circumstances, we may adjust our stress factors where the definition of loss ratio and/or dilution ratio is abnormally low or high. For instance, we typically would apply lower stress factors to our stressed dilution if the calculation applicable to a 'BB' rating level is resulting in a stressed dilution level that is close to 100%.

RELATED PUBLICATIONS

Criteria to be fully superseded

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- Methodology And Assumptions For Rating Brazilian Trade Receivables Securitizations, May 13, 2009
- Trade Receivables Criteria: Measuring Performance: The Sales-Based Approach for Trade Receivables, Sept. 1, 2004
- Trade Receivables Criteria: Evaluating Trade Receivable Credit Related Risks, Sept. 1, 2004
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- Global Framework For Payment Structure And Cash Flow Analysis Of Structured Finance Securities, Dec. 22, 2020
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The proposed criteria represent the specific application of fundamental principles that define credit risk and ratings opinions. Once proposed criteria become final, their use is determined by issuer- or issue-specific attributes as well as our assessment of the credit and, if applicable, structural risks for a given issuer or issue rating. Methodology and assumptions may change from time to time as a result of market and economic conditions, issuer- or issue-specific factors, or new empirical evidence that would affect our credit judgment.