

Article Title: Criteria | Structured Finance | General: Foreign Exchange Risk In Structured Finance--Methodology And Assumptions Data: (EDITOR'S NOTE: —On July 19, 2023, we republished this criteria article to make nonmaterial changes. See the "Revisions And Updates" section for details.)

OVERVIEW AND SCOPE 1. S&P; Global Ratings' foreign exchange (FX) risk criteria provide rating-specific asset depreciation stress assumptions for the behavior of FX rates in global structured finance transactions with unhedged or partially hedged currency exposures. 2. FX risk arises when there is a currency mismatch in a transaction in which the asset cash flows and liabilities are denominated in different currencies. We assume that the asset cash flows will depreciate over time if no currency hedges mitigate the currency risk exposure. 3. We have developed our analytical approach for modeling FX exposure risk by using a nonparametric distribution. We estimate and incorporate monthly currency depreciation stress curves as inputs into the relevant cash flow analysis to evaluate a transaction's potential currency exposure risk. 4. This criteria article replaces the commentary article, which formed the basis for our analytical methodology, "Modeling Unhedged Foreign Exchange Risk In Structured Ratings" (see the "Revisions And Updates" section). 5. The criteria described in this article became effective as of the publication date and apply within scope to all new and outstanding global structured finance transactions with unhedged or partially hedged foreign currency exposures ranging from one month maturity to 15 years of maturity. These criteria also apply to certain covered bonds in which we evaluate FX risk in a deterministic approach and to other structured transactions in which currency risks exist, such as enhanced equipment trust certificates or similar transactions. 6. These criteria do not apply to covered bonds other than those described above, to transactions with FX risk exposures that have less than a one-month maturity, or to project finance issues. Also, for transactions with periodic payments beyond 15 years of maturity, we may apply these criteria by assuming the 15th year depreciation stresses to remain in effect for the subsequent years of cash flows. Key Publication Information Original publication date: April 21, 2017. Effective date: April 21, 2017. These criteria address the fundamentals set out in "Principles Of Credit Ratings," published Feb. 16, 2011. These criteria should be read in conjunction with the related guidance article "Guidance: Foreign Exchange Risk In Structured Finance," published June 5, 2018.

METHODOLOGY 7. S&P; Global Ratings' analysis of FX risk exposure in structured finance transactions reflects qualitative and quantitative assumptions. We may update these assumptions periodically to reflect additional data and developments, such as changes in market conditions and performance trends, issuer- or issue-specific factors, or new empirical evidence affecting our analytical judgement. FX risk tends to be small and one of the secondary risk factors in structured finance--and, in most cases, currency risk is hedged. We may apply additional transaction-level stress tests and a sensitivity analysis based on our credit judgment if we view FX movements as a primary risk factor, rather than secondary. 8. The criteria provide the currency depreciation stress percentages for each periodic payment up to the transaction's maturity. Under these criteria, we use our Foreign Exchange Risk Model (FERM) to generate the monthly currency depreciation stress curves for each pair of asset-liability currencies in a transaction. Depending on the specific structure of each transaction, we may also choose to apply fixed depreciation stress percentages during the transaction's life up to the maturity to evaluate a currency mismatch. For example, for those covered bonds in scope of these criteria, which feature bullet maturities, we typically apply a peak fixed depreciation percentage over the life of each note's exposure to FX risk. 9. In general, structured finance transactions can have assets and liabilities denominated in different currencies. For example, while a transaction may hold assets denominated in U.S. dollars (USD), its liabilities may be denominated in British pounds (GBP) or euros (EURO). The FERM model generates stress percentages for the asset currency-denominated cash flows assumed to be depreciating over time against the liability currencies in a transaction. 10. The FERM model currently calculates the depreciation stress percentages for a combination of major currencies or asset-liability pairs of currency time series, including USD, GBP, EURO, and Japanese yen. Most outstanding structured finance transactions tend to have exposures to USD, GBP, and EURO exchange rates; however, we may calculate depreciation assumptions for other major exchange rates by using this model. In some cases, depending on a transaction's specific characteristics, we may choose to further adjust these FX stress assumptions if we believe that the adjusted curves better capture the transaction's exposure to FX risk. We may also use a subset of historical FX data in the FERM model if

we believe that historical exchange rate data are not necessarily a good proxy for the expected future behavior. In addition, for other non-major and emerging market currencies, we may develop transaction-specific FX stress assumptions to account for the higher level of volatility typically associated with those currencies. 11. The FERM model uses a nonparametric approach to fit the historical returns over various horizons of currency exchange rates. We compute monthly FX data (quoted in terms of the number of units of liability currency for each unit of asset currency) by averaging daily time series of exchange rates in each month. In the model, for a given horizon ranging from one month to 180 months, we first calculate the returns (percent changes) for that horizon by using monthly FX data. For each time horizon, we compute the distribution of returns over that horizon on a monthly rolling basis. For example, we calculate the returns between months one through six, months two through seven, and so on in order to create the historical distribution of six-month-horizon returns. 12. For each time horizon, the historical distribution of returns for that horizon is obtained, and percentiles are calculated from the historical distribution. The analysis uses the 95% and 75% percentiles from the distribution to determine the applicable currency depreciation stress percentages for 'BBB' and 'B', respectively. We repeat this process for all empirical distributions for varying time horizons. For a given rating level, connecting these computed depreciation percentages for each time horizon ranging from one month to 180 months creates a path over time. We assume the stress levels for 'AAA' to be the higher of i) 1.8x the levels of 'BBB' at the 95th percentile of the nonparametric distribution, and ii) the historical maximum depreciation for the relevant exposure window. We select the 75th percentile for 'B', while other rating-specific stress levels are calculated through linear interpolation. 13. For example, table 1 below shows the 60-month currency depreciation percentages calculated by using the FERM model for exposure to FX risk among major currencies at various rating levels. The 'AAA' stress assumption for USD assets versus EURO liabilities is 58% in table 1. This means, for a transaction with U.S. dollar-denominated assets and EURO liabilities, these criteria assume that the USD assets would depreciate by 58% over 60 months from the starting value, or the amount of pledged assets without overcollateralization or undercollateralization is able to support only 42% of the liability in terms of the liability currency (the EURO/USD quote in this example) at closing. The table also shows depreciation percentages for other currency combinations as examples. These FX depreciation percentages are for illustrative purposes only. For the full list, please see "Guidance: Foreign Exchange Risk In Structured Finance," June 5, 2018. The FERM model is periodically calibrated and may yield different results at different times. Table 1 Sample Currency Asset Depreciation Percentages Against Currency Liabilities (60-MONTH TIME HORIZON EXAMPLE) RATING LEVEL(I)(II) CURRENCY COMBINATIONS AAA (%) AA (%) A (%) BBB (%) BB (%) B (%) USD assets versus EURO liabilities 58 49 41 32 23 14 EURO assets versus USD liabilities 65 56 46 36 24 11 USD assets versus GBP liabilities 43 37 30 24 17 11 GBP assets versus USD liabilities 62 53 43 34 26 17 USD assets versus JPY liabilities 61 52 43 34 24 14 JPY assets versus USD liabilities 51 43 36 28 20 11 EURO assets versus GBP liabilities 35 30 25 20 14 8 GBP assets versus EURO liabilities 48 41 34 27 22 17 (i)The depreciation percentages apply to foreign exchange rates quoted in terms of liability currencies. This means a quote of x units of the liability currency for each unit of the asset currency. (ii)We use the currency exchange data since 1971 for most currency pairs to calculate the depreciation percentages. However, we use the data since 1990 for the USD-JPY currency combination after the elimination of the periods of structural changes in the currency markets. USD--U.S. dollar-denominated. EURO--Euro-denominated. GBP--British pound-denominated. JPY--Japanese yen-denominated. 14. This paragraph has been deleted.

REVISIONS AND UPDATES This criteria article was originally published and became effective on April 21, 2017. Upon publication, it implemented limited changes in the methodology or assumptions included in the commentary article "Modeling Unhedged Foreign Exchange Risk In Structured Ratings," published Nov. 20, 2000. The FX risk model includes the most recent historical data, including the post-Brexit period. Changes introduced after original publication: Following our periodic review completed on April 19, 2018, we deleted paragraph 14, which was related to the original publication and no longer relevant, and updated the contact information and the Related Criteria And Research section. We updated the Related Research section to include "Guidance: Foreign Exchange Risk In Structured Finance," following its publication on June 5, 2018. On June 12, 2019, we republished this criteria article to make nonmaterial changes to update criteria references. On June 5, 2020, we

republished this criteria article to make nonmaterial changes to update criteria references. On June 9, 2021, we republished this criteria article to make nonmaterial changes to paragraph 12 to clarify the application of stress levels for 'AAA'. We also updated outdated criteria and research references. On Dec. 14, 2022, we republished this criteria article to make nonmaterial changes. In connection with the publication of "Project Finance Rating Methodology," which addresses the analysis of foreign exchange risk in project finance transactions, we amended paragraphs 5 and 6 to remove project finance issues from this article's scope. In addition, we updated contact details and references to related research. On July 19, 2023, we republished this article to make nonmaterial changes. To mirror updates made in these criteria's related guidance article, we updated noncriteria text in table 1 related to sample currency asset depreciation percentages against currency liabilities for JPY assets versus USD liabilities. We also updated Key Publication Information and added a reference to the related guidance in paragraph 13. RELATED PUBLICATIONS Related Criteria Counterparty Risk Framework: Methodology And Assumptions, March 8, 2019 Principles Of Credit Ratings, Feb. 16, 2011 Related Research S&P; Global Ratings Definitions, Nov. 10, 2021 Credit Rating Model: Foreign Exchange Rate Model, April 24, 2017 Related Guidance Guidance: Foreign Exchange Risk In Structured Finance, June 5, 2018