

Criteria | Structured Finance | General:

Global Framework For Cash Flow Analysis Of Structured Finance Securities

October 9, 2014

(Editor's Note: This criteria article has been retired in most countries and superseded by "Global Framework For Payment Structure And Cash Flow Analysis Of Structured Finance Securities," Dec. 22, 2020. This article is still active for certain Latin American jurisdictions that require local registration for the new criteria. In those jurisdictions, the new criteria will become effective only after the local registration process is completed.)

1. S&P Global Ratings issue credit ratings are forward-looking opinions of issuers' abilities and willingness to make payments on specific financial obligations as promised, on time, and in full as they come due. In structured finance transactions, these promised payments generally consist of interest that is typically due periodically (but may be deferrable) and principal that is typically due in full by legal final maturity. We perform cash flow analysis to determine if a transaction has sufficient credit and liquidity enhancement to pay its obligations under rating stress scenarios consistent with our rating definitions. In addition, we may use cash flow analysis to test a transaction's credit stability during a moderate economic stress period in accordance with our credit stability criteria.
2. These new criteria do not represent a departure from our existing views. Rather, S&P Global Ratings is setting forth a general methodology for assessing the creditworthiness of structured finance securities under a global cash flow framework after considering the credit quality of the assets and the legal, operational, and counterparty risks of the transaction, including its payment structure. Appendix 1 lists the typical questions and issues that our cash flow analysis seeks to address, along with the related paragraph in these criteria that focuses on each issue. The criteria do not supersede asset-specific criteria; where we have criteria for an asset class, that criteria shall be applicable.

SCOPE OF THE CRITERIA

3. The criteria apply to all structured finance securities that rely primarily on cash flows generated by a pool of assets to pay bond interest and principal. We refer to these as cash flow transactions, which primarily include asset backed securities (ABS), collateralized debt obligations (CDO), commercial mortgage backed securities (CMBS), covered bonds, and residential mortgage backed securities (RMBS). Some examples where the criteria do not apply include:
 - Transactions that depend primarily on collateral sales to pay bond principal (such as market value CDOs and leveraged closed-end funds),
 - Asset backed commercial paper (ABCP) transactions that look to a liquidity provider for repayment of the debt obligations,

ANALYTICAL CONTACTS

We Chen Foo, CFA

New York
+ 1 (212) 438 3236
we.chen.foo
@spglobal.com

Belinda Ghetti

New York
(1) 212-438-1595
belinda.ghetti
@spglobal.com

Kate J Thomson

Melbourne
(61) 3-9631-2104
kate.thomson
@spglobal.com

CRITERIA CONTACTS

Herve-Pierre P Flammier

Paris
(33) 1-4420-7338
herve-pierre.flammier
@spglobal.com

Takamasa Yamaoka

Tokyo
(81) 3-4550-8719
takamasa.yamaoka
@spglobal.com

- Stand-alone (single borrower) and large-loan CMBS transactions that are typically backed by fewer than 20 loans,
- Referenced and repackaged securities (RRS) where the credit rating is linked to that of the underlying asset, and
- Synthetic CDOs backed by credit default swaps.

SUMMARY OF THE CRITERIA

4. Payment structure and cash flow mechanics (cash flow analysis) together comprise one component of our rating analysis and complement the other four parts of the analysis: credit quality of the securitized assets, legal and regulatory risks, operational and administrative risks, and counterparty risk. We derive stress assumptions based on risk factors that typically arise from these four components and perform cash flow analysis of the assets, capital structure, and payment structure to determine the bonds' likelihood of payment under economic scenarios consistent with our rating definitions. The higher the rating, the more stressful the economic scenario the bond must survive without defaulting on principal or missing a promised interest payment.
5. Our stress assumptions are primarily asset-specific and generally encompass our analysis of historical credit performance, our forward-looking view, and the economic scenarios described in paragraph 4. For traditional assets, such as auto loans and mortgages, the variables that we generally stress include default or loss rate, loss timing, voluntary prepayment speed, market value decline, recovery rate, and recovery timing whenever applicable. Wherever relevant, we may apply cash flow stresses to account for legal, operational, and counterparty risks that are not mitigated by the transaction structure. Examples include set-off losses, commingling losses, and interest rate or basis risk due to an unhedged structure. All stress variables derived from the four analytical components generally map to, or incorporate, an element of credit stress and/or liquidity stress. Credit stress is linked to the risk of defaulting on bond principal at legal maturity, and liquidity stress is linked to the risk of missing a bond interest payment.
6. We generally analyze traditional assets using a credit-driven default and recovery framework, whereas we may take a factor-driven haircut approach with respect to nontraditional assets, such as stranded costs, tobacco settlements, film royalties, and whole business securitizations. Regardless of the asset type backing the rated notes, our stress assumptions are designed to alter the timing and magnitude of the cash flows generated by the asset pool and test whether these cash flows are sufficient to pay timely interest (if promised) and full principal on the rated notes by their legal maturity. A transaction might have various enhancements and structural features in place to shield the notes from principal losses and interest shortfalls. We typically customize our cash flow assumptions to test the robustness of the transaction structure and determine if there is sufficient enhancement to absorb losses from credit stresses and prevent interest shortfalls from liquidity stresses to the degree consistent with our rating definitions.
7. This paragraph has been deleted.
8. This paragraph has been deleted. See the "Revisions And Updates" section.

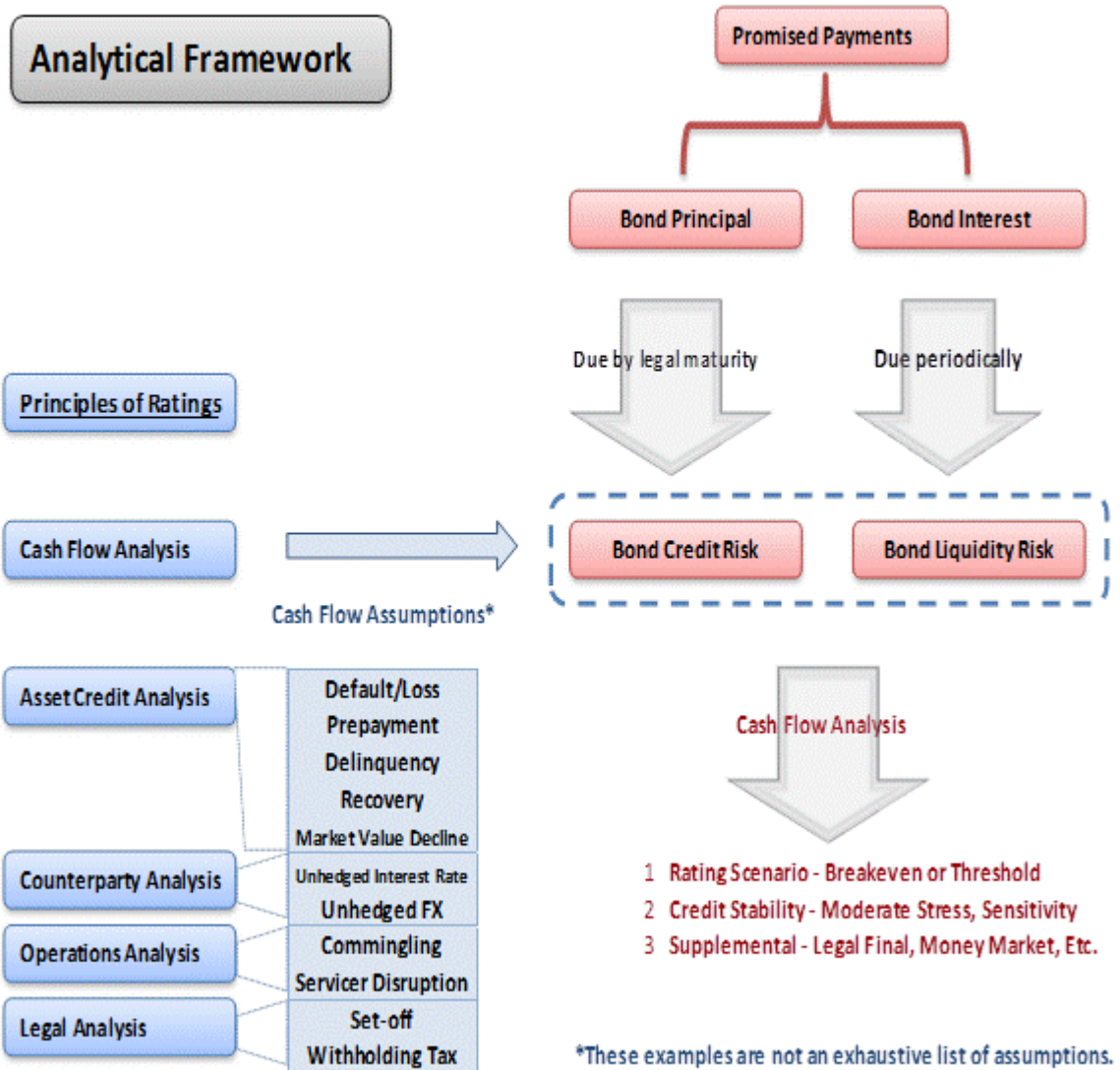
METHODOLOGY

9. Cash flow analysis is a critical component of our rating analysis because enhancement that is present on a transaction's closing date might not be available to protect against losses when needed--even if the enhancement has been sized appropriately for the rating stress. This

potential mismatch between enhancement at closing and enhancement available over the pool's life can arise due to unpredictable timing of losses or provisions in the transaction's structure that allow enhancement to be released. Cash flow analysis links the credit quality of the assets and legal, operational, and counterparty risks of the structure to the periodic payments due to noteholders as specified by the priority of payments (the "waterfall"). It also allows us to test the sensitivity of the transaction to loss timing and to identify potential structural vulnerabilities.

10. While our ratings address the timeliness of payments, the credit analysis of a securitized pool is generally a static analysis because there is no time component when estimating a pool's lifetime losses under various stress scenarios. However, the timing of losses (or delinquencies, defaults, recoveries, or liquidations) may positively or negatively affect the issuer's ability to meet its payment obligations in a timely manner. The analysis of payment structure and cash flow mechanics factors in timing of losses and other variables, such as interest rate and asset prepayment curves, and determines how these variables interact with a transaction's payment structure.
11. In our cash flow analysis, we model inflows of cash to the issuer--typically a special-purpose entity (SPE)--primarily from the assets and outflows of cash in accordance with the transaction's payment waterfall under a variety of scenarios. We also account for the impact of performance tests that might operate as triggers that change the distribution priorities if they are breached. Finally, for securities that rely on support facilities from third parties, such as servicer advances, liquidity facilities, insurance policies, and derivative instruments, we incorporate the payment mechanics for those facilities in our analysis. We test a range of possible outcomes in our scenarios and direct attention to specific credit instability in a transaction's structure that might warrant further analysis. The rated securities should survive a range of scenarios from more benign conditions up to and including stress conditions commensurate with the ratings on the securities.

Analytical Framework



© Standard & Poor's 2014

12. The analytical framework for jointly assessing pool performance and payment structure generally consists of the following three types of cash flow analysis: (i) rating scenario analysis, (ii) credit stability analysis (also called "sensitivity analysis"), and (iii) supplemental analysis. In a rating scenario analysis, we determine if the enhancement and structure are appropriate for the rating of the bond, as reflected in the associated economic scenario. We then determine if the enhancement and structure are adequate to maintain ratings within certain bounds (as outlined in our credit stability criteria) under moderate stress or other sensitivity scenarios (see "Methodology: Credit Stability Criteria," May 3, 2010). We may supplement these scenarios with

additional bond structure analyses, as explained in paragraph 16.

13. All three types of cash flows share a common objective--to determine if the transaction is adequately protected against credit risk (principal by legal maturity) and liquidity risk (timely interest and senior fees as promised). Interest is typically promised at regular intervals, such as monthly, quarterly or semi-annually, and failure to pay the full amount due on the payment date typically results in default. For certain bonds, such as deferred-interest and payment-in-kind (PIK) bonds, the terms of the promise allow interest to accrue or defer to future periods without incurring a payment default, which we typically factor into our cash flow analysis. For all bonds, credit and liquidity risks are greater as the economy worsens, and we generally increase credit and liquidity stresses as we move up the rating scale accordingly.

Rating Scenario Analysis

14. To determine if a transaction has sufficient enhancement and appropriate structural protections to withstand an economic stress consistent with the rating scenario, we typically undertake a breakeven or threshold approach. In a breakeven scenario, we generally calculate the maximum amount of losses that can be run in the model while still ensuring that the bond is fully repaid by legal maturity with timely interest each period. For a bond to pass, the breakeven level of losses should exceed the level of losses commensurate with the rating for the bond (the threshold loss). In a threshold approach, we apply the threshold level of losses for the rating and check whether the bond receives full principal by legal maturity with timely interest.

Credit Stability Analysis

15. We may undertake a credit stability cash flow analysis to determine whether a transaction has enough enhancement and structural protections to maintain credit stability of the bonds during a moderate economic stress environment. This analysis is particularly useful when analyzing transactions with initial enhancement that can be released prior to the underlying pool's peak loss period. Although there might be minimal releases of enhancement in an 'AAA' cash flow stress scenario due to triggers and targets that may prevent releases, there could be significant releases in a moderate stress scenario if enhancement targets are met and triggers are not tripped. If releases occur prior to the peak loss period, the rated bonds might experience a reduction in loss coverage that could lead to rating downgrades that exceed the prescribed limits as outlined in our credit stability criteria.

Supplemental Analysis

16. In the rating scenario and credit stability analyses, we primarily test the enhancement and payment structure. We may supplement these analyses by testing other aspects of the transaction, such as the legal final maturity of the bonds, the tranche size of net interest margin (NIM) or money market securities, or sensitivity to asset correlation in the case of CDOs. For example, if a portion of the note balance is still outstanding at legal final maturity in a breakeven run, the notes will generally be deemed to be in default, notwithstanding that credit enhancement is still positive at legal final maturity. Therefore, we run a legal final scenario to determine the appropriate legal final maturity. We typically assume low voluntary prepayments and no recoveries to slow down principal payments and thereby extend the weighted average life of the bonds. Appendix 2 provides further details on supplemental analysis and other asset and structural considerations that we factor into our cash flow analysis.

ASSUMPTIONS

Cash Flow Assumptions

17. Our cash flow stress assumptions are based on our review of the relevant credit, legal, operational, and counterparty risks that typically arise in a given transaction structure and collateral pool. From our credit analysis of the pool, we may determine stress variables such as default or loss rate, loss timing, voluntary prepayment rate, market value decline, recovery rate, and recovery timing, as applicable to the asset type. These stresses are generally based on historical performance, our forward-looking view, and the appropriate rating scenarios. For nontraditional assets, our analysis is typically factor-driven and may encompass asset-specific stresses, such as cigarette consumption rate for tobacco settlements or forecast revenue streams for pharmaceutical drug royalties and other intellectual property assets. From our review of the assets, liabilities, and counterparty risk, we may stress interest rate curves if the assets or liabilities are floating-rate and/or unhedged, or if transactions contain hedging instruments that fail to satisfy our counterparty criteria. In addition, we may apply a set-off loss stress based on our legal analysis or a servicer disruption loss stress based on our operational analysis.
18. Certain assumptions incorporate elements of both credit and liquidity stress, while others are purely liquidity stress. For example, a default assumption has two dimensions: default rate (which affects the total amount of cash flow available to pay off bond principal by legal maturity, or credit stress) and default timing (which affects the amount of cash flow available in any given period to make interest payments, or liquidity stress). In some circumstances, we may apply pure liquidity stresses by modeling delinquency, deferment, or servicer stop-advance rates (see paragraphs 30 and 31 for further details) to stress interest payments.

Defaults

19. For a rating scenario, we generally determine the stressed default rate based on asset-specific credit factors and collateral characteristics, as explained in our criteria for the given asset class. As an example, for global CDOs, we use scenario default rates (SDRs) that represent the modeled level of gross defaults that CDO Evaluator estimates for every rating level based on pool credit quality, asset correlation, and tenor of the debt. For global CMBS, we apply our property evaluation criteria and make loan-level adjustments to derive our enhancement levels and the corresponding stressed default rates at each rating.
20. We may take into account certain pool characteristics, such as credit quality and loan payment status, when we determine the loss timing to apply in the cash flow analysis for a rating scenario. For example, if the pool's assets are predominantly of lower credit quality or shorter maturity, we would generally expect that defaults will occur more quickly. The timing of losses in the cash flow analysis may also account for economic cycles. Where appropriate, we may apply losses at a rate that is both faster and slower than the historical loss curve to stress excess spread. Applying faster-than-average losses reduces excess spread generated in the breakeven cash flows, and applying slower-than-average losses tests the payment structure for releases of enhancement. Releases reduce the breakeven levels, or the maximum amount of losses that the transaction can withstand without causing the notes to default.
21. For a credit stability analysis, we may run a variety of default curves to identify potential weaknesses in the transaction structure. For example, enhancement in certain structures may be released to the seller and/or the subordinate noteholders to the extent that it is at its target

amount and is not needed to cover losses in any given month. As such, the timing of losses will affect the amount of credit enhancement that remains in the transaction to cover losses. These structures are called "amortizing enhancement" or "pro rata" structures (see paragraph 42), as each tranche of debt (and the seller in some instances) gets its pro rata share of remaining principal collections after the senior noteholders have received their pro rata share of principal.

Prepayments

22. Voluntary prepayments are principal payments in addition to the scheduled principal payment that is set by the amortization terms of the contract. Voluntary prepayments can occur due to debt refinancing or consolidation, early retirement of the debt, or curtailments, among other reasons. Prepayments could be a concern because the prepayment of higher-quality or shorter-term receivables could result in a pool's remaining receivables consisting of lower credit quality or longer-maturity loans, respectively. Structural features, such as enhancement floors, may be incorporated into the payment mechanics of a transaction as a mitigating factor where this risk exists (see paragraph 43 for more details).
23. For a rating scenario, we typically apply various prepayment assumptions that are faster or slower than historically observed. If the yield on the assets is greater than the cost of debt plus servicing (i.e., there is positive excess spread), then using faster prepayment rates will stress excess spread by shortening the weighted average life of the pool and reducing the amount of credit enhancement available. However, if there is negative excess spread in a transaction, then running faster prepayment rates will not stress the cash flows and, therefore, a lower prepayment rate will typically be used. We may also model low prepayment rates to stress transactions backed by assets that have balloon payments at contract maturity, such as U.S. auto lease and certain European ABS. Although it is uncommon to have high prepayment rates occurring in a high-stress economic environment, we generally run high prepayment rates in our stress scenarios, particularly at higher rating levels. This is because we are seeking to stress excess spread, which we consider "soft" enhancement because the amount is not known in advance and depends on prepayments and losses incurred on the pool over time.
24. We adjust our prepayment assumptions by asset class and by geographic region, as certain products within the same asset class might vary significantly within or across different regions. For example, we may reduce prepayment speeds for certain residential mortgage loans that have prepayment lockout features and that assess penalties for prepayments in excess of prescribed limits. Similarly, in CMBS transactions, some loans have prepayment lockout periods.

Recoveries

25. Similar to our default assumptions, our recovery assumptions typically have two dimensions: the percentage of the defaulted principal balance that's recovered (recovery rate--credit stress) and the timing of the proceeds flowing to the SPE (recovery curve--liquidity stress), which may incorporate one or more delays or recovery lags. The level of recoveries and the timing of their receipt depend on the characteristics of the asset, and range from 0% to 100% recovery and from minimal delay (after the contract is charged off) to two or more years of delay, respectively.
26. In a rating scenario analysis, characterized by high defaults and stresses appropriate for the rating, we generally derive our stressed recovery rate for consumer and commercial loan and lease contracts by applying a haircut to historical recovery rates and making adjustments based on asset-specific factors when necessary. For receivables that are secured by collateral, our recovery rate assumption is generally based on our view of the market value decline that will be

experienced by liquidating repossessed assets in a stressed economic environment, net of repossession expenses. Unsecured assets that are not backed by collateral, such as private student loans and credit card receivables, generally tend to have low recoveries.

27. When the asset is a broadly syndicated loan or bond held in a CLO portfolio or a structured finance instrument held in a CDO, we generally base our recovery rate assumption on our asset recovery rating. If the asset does not have a recovery rating, we assign a recovery rate based on its general asset type, its priority within the obligor's debt hierarchy, and its country grouping (which is based on insolvency legal frameworks). For example, we apply a higher recovery rate to a senior secured loan with a first lien than we would on a mezzanine, second-lien, or senior unsecured loan or bond. Furthermore, we tier our recovery rate assumptions based on the rating of the tranche, with higher-rated notes being stressed with lower recovery rates.
28. The timing of recoveries depends on the defaulted asset in question and may include a recovery lag from the period the asset defaults. For example, we generally assume a delay of 12-24 months for CLOs of European small and medium enterprise (SME) loans, because European SME assets tend to go through the full workout process. For global RMBS transactions, we derive our recovery lag assumptions from typical foreclosure periods commensurate with local requirements on how a lender can repossess and sell a property. Unsecured loans that lack third-party or government guarantees, such as private student loans, tend to realize recoveries over a longer time horizon. For private student loans, we might assume a recovery curve of five years or longer.
29. Not all asset types are assessed a recovery lag in our cash flow analysis. For CDOs of corporate bonds, we typically apply recoveries in the same payment period as the asset default because a CDO manager can sell the defaulted asset before the end of the workout period. Similarly, in the U.S., defaulted loans or leases that are backed by motor vehicles usually recover a portion of the principal balance in a lump-sum amount upon a sale of the collateral. In these cases, we typically assume that the recovery proceeds flow to the SPE during the payment period when the liquidation occurs.

Modeling Liquidity Stresses

30. A liquidity stress is designed to determine the degree of interest shortfall risk that could compromise the timeliness of interest payments to the rated bonds. Interest shortfalls occur when cash inflows for a particular month are insufficient to pay the full amount of interest due on the rated bonds plus senior fees. This can occur if cash flows from the asset pool are delayed due to nonpaying, delinquent, or defaulted assets. These delays may cause a timing mismatch between cash inflows from the pool and cash outflows to the bonds in a given period. Interest shortfall risk could also increase if there are fixed senior fees that grow as a percentage of a declining pool balance. Finally, interest shortfalls can also be caused by declining yield on the assets or increasing weighted average cost on the notes, which can result in negative excess spread.
31. Certain structural provisions or enhancements can mitigate liquidity risk. Examples include using collateral principal collections to pay fees and bond interest, or using a cash reserve account to cover interest and expense shortfalls. Because our ratings address both the amount and the timeliness of payment, we test whether senior fees and bond interest can be paid when due each period over the life of a transaction. Generally, in order for a bond to pass a stressed cash flow scenario, interest must be paid in full on its due date throughout the transaction's life unless it is deferrable. We typically apply different types of liquidity stresses based on the asset class in question:
 - For RMBS transactions, servicers will stop advancing on some percentage of delinquent and

defaulted loans.

- For student loan ABS, some percentage of the loans will remain in a nonpayment status (such as deferment or forbearance) for a period of time.
- For Federal Family Education Loan Program (FFELP) student loan ABS, there will be a delay of 21 months before payment claims are reimbursed by the U.S. Department of Education.
- Generally, there may be a lag in recovering principal proceeds on defaulted receivables, depending on the asset in question, as discussed in paragraph 28.
- Generally, prepaying or defaulting high-yielding assets at a faster rate than lower-yielding assets will compress excess spread.

Payment Waterfall

32. The payment waterfall, along with any associated enhancement targets and performance triggers, sets forth the priority and manner in which transaction parties and noteholders receive payments from the transaction's available distribution amounts. These amounts may include interest and principal collections, reserve fund proceeds, and/or swap payments. In conjunction with a transaction's enhancement level, the payment waterfall has a significant impact on the likelihood that the rated bonds can withstand credit and liquidity pressures from cash flow stresses on the underlying pool. For instance, a higher position in the waterfall for bond interest payments, along with any mitigating structural features described below, increases the timeliness of payment. The bond principal payment mechanics determine the buildup, retention, usage, and release of enhancement, including overcollateralization and excess spread, where applicable. These mechanics also determine the allocation of losses to the capital structure, with subordinate tranches typically absorbing principal write-downs before senior tranches.
33. The payment waterfall determines how effectively a transaction's initial enhancement will protect the rated bonds from credit and liquidity stresses. Different principal payment structures will influence the credit stability of the notes for a given credit stress on the underlying asset pool, depending on how targets and triggers are designed to build enhancement or switch payment allocations/priorities at certain steps of the waterfall. Therefore, the modeling of the payment waterfall, targets, and triggers is essential to our assessment of whether a bond can withstand rating scenarios (breakeven or threshold) consistent with the assigned ratings, and whether the credit stability of the bonds is consistent with our credit stability criteria under moderate stress scenarios.

Pre-Interest Items

34. Servicing, trustee, and management fees are generally the highest obligations in the payment waterfall, followed by interest due on the notes. Their senior position in the waterfall increases the likelihood that timely payments on these obligations will be made each period. We generally model the senior fees and expenses at their maximum allowable amounts to test whether the periodic available cash can pay senior fees and expenses at their maximum amount, while paying timely interest payments over the transaction's life. With respect to servicing fees, we typically model the higher of the actual and market rate fee in a senior position in the waterfall so that these costs are generally reflected in the cash flow analysis. Uncapped senior fees and expenses might pose a risk to timely payment of interest to the noteholders, because an unexpected spike in uncapped fees in any given month at the top of the payment waterfall could exhaust all available cash flow for the month (see "Criteria Methodology Applied To Fees, Expenses, And Indemnifications," July

12, 2012).

35. We generally model the cash inflows and outflows in accordance with the specified terms of any hedging instruments, such as swaps, caps, and floors, provided the instruments satisfy our derivative agreement criteria. Such terms may include priority in the payment waterfall, benchmark index (whether for interest rate or currency), margin to the index, reset frequency, and notional. If the securitization could be rated above the hedge counterparty's rating, we look for the contract terms to satisfy our counterparty risk criteria. If the assets and liabilities are unhedged, we model the transaction without benefit of a hedge. In certain cases, the index and/or reset dates of the assets do not match that of the liabilities, which introduces basis risk. We may then stress the difference between the indices in our cash flow analysis. If the transaction is hedged but the hedge contract does not meet our derivative agreement criteria, then we model the transaction without benefit of cash inflows from the hedge, but account for potential liabilities due under the contract, such as breakage costs (see paragraph 90 "derivative-independent approach" of "Global Derivative Agreement Criteria," June 24, 2013).

Interest Analysis

36. With respect to bond interest, payment waterfalls generally fall into three categories: (1) interest on all classes is always paid before principal on all classes ("IIPP"); (2) principal on a senior class is paid before interest on a subordinate class ("IPIP"); or (3) interest on a subordinate class is paid before principal on a senior class (IIPP) in relatively benign conditions, but can be diverted to pay principal on the senior class (IPIP) in more stressful conditions. The third type is commonly referred to as an "interest reprioritization structure" or "priority principal structure." Each type of payment waterfall poses varying levels of liquidity risk to the subordinate notes. We rely on cash flow analysis to ascertain the likelihood that the rated subordinate notes could miss timely interest payments in rating scenarios that they are otherwise expected to pass for their given rating.
37. The IIPP waterfall poses the least amount of liquidity risk to the capital structure as a whole because of the senior position of all interest payments, including those of the subordinate notes. In contrast, the IPIP waterfall introduces the risk that a liquidity stress (possibly a spike in losses) can cause an interest shortfall on the subordinate note given that senior principal is higher in the waterfall. A dedicated reserve account that can be drawn only to pay subordinate note interest may mitigate this risk. Alternatively, the class that is no longer receiving timely interest receives a payment-in-kind instead, where the deferred interest amount accrues until it is paid, or the principal balance of the class is increased by the amount of deferred interest that is unpaid. To test whether the timely payment of interest on the subordinate notes is jeopardized by an IPIP payment structure, various cash flow scenarios are typically run where defaults are spiked in several periods of the transaction.
38. An interest reprioritization waterfall blends IIPP and IPIP. It typically incorporates parity tests, qualitative factors, and/or other cash flow triggers at certain steps in the waterfall such that subordinate interest can be diverted to pay senior principal only in the event the senior note falls below parity with the pool balance. Cash flow analysis illustrates that in stress scenarios that are beyond those designed to be tolerated by subordinate notes, subordinate note interest is typically not paid toward the tail end of a transaction, as it is instead diverted to pay principal on the more senior notes.
39. We also analyze whether interest and principal collections from the pool are channeled into a single account or directed to separate accounts. Structures that pool interest and principal together, or those that allocate them separately but then reallocate the funds when needed (effectively pooling on an as-needed basis), have greater ability to pay fees and bond interest on a

timely basis. Principal collections can be used to pay fees and bond interest to the extent that available cash flows are temporarily delayed due to delinquencies or defaults. However, to the extent that principal collections on the assets are not used to pay down the balance of the notes, but instead are used to pay fees or interest, the amount of initial enhancement available to cover credit losses will be reduced. If this scenario is not factored into the analysis, a downgrade of the notes could occur. In an extreme case, this could lead to principal shortfalls on the notes at their legal final maturity.

Principal Analysis

40. The cash flow analysis of the principal payment allocations helps determine how effective the initial enhancement is in protecting the rated notes from credit and liquidity stresses of the underlying pool. The two general principal payment structures are sequential and pro rata payment. In the former, principal payments on the notes are paid sequentially (all principal is paid only to the most senior class of notes outstanding) in order of seniority in the capital structure, with the next most senior note not receiving principal until its immediate senior is paid in full. In the latter, each note in the capital structure generally receives up to its pro rata share of principal, or an amount of principal necessary to maintain each note's target enhancement level.
41. Sequential payment results in deleveraging from the standpoint of the most senior notes outstanding because subordination increases as a percentage of a declining pool balance as the transaction seasons and the senior tranches are paid down. The deleveraging effect is compounded if the payment waterfall also directs residual cash flow or excess spread toward additional payments of bond principal. This is commonly known as a "turbo feature." Sequential payment structures result in the most effective preservation of initial enhancement because enhancement is not released prior to the onset of peak defaults and is therefore available in full to absorb the defaults. As senior debt is repaid before any amortization of the subordinate debt is made, the weighted average cost of debt generally rises as the lower-cost senior notes are paid off.
42. Pro rata payment does not confer any deleveraging benefit, and may therefore be less effective in preserving initial enhancement than sequential payment structures. Pro rata structures may release enhancement prior to the peak loss period such that part of the initial enhancement may no longer be available when peak losses occur, which makes them potentially susceptible to back-ended defaults. In these structures, subordination remains constant as a percentage of the current pool balance, because each tranche in the capital structure receives its proportionate share of bond principal payments. This risk could be mitigated by including performance triggers that switch the principal allocation to sequential--for example, if losses exceed certain thresholds or if the pool balance falls below a certain percentage of its initial balance. Enhancement targets can be used in conjunction with pro rata structures to delay the early release of enhancement.
43. An enhancement floor may ensure that the transaction will have a minimum level of enhancement. It can take the form of a minimum reserve account or overcollateralization amount. An enhancement floor is useful for protecting the notes from tail risk at the tail end of the pool's life. Tail risk arises when the pool factor (the remaining pool balance as a percentage of the initial balance) decreases to a low percentage (usually below 10%) and the optional redemption is not exercised. The remaining receivables in the pool may consist of lower credit quality or longer-maturity loans. A default that occurs when the pool factor is low could result in an outsize adverse effect on the notes. Ironically, tail risk can manifest when the pool exhibits good credit performance, as this may allow for the release of enhancement. Having a floor prevents further release of enhancement below the specified minimum amount.
44. Loss performance triggers will invariably be tripped during rating scenario (breakeven or

threshold) runs and make pro rata structures look like sequential structures, as enhancement is not released owing to the tripped triggers. However, in the more likely moderate stress scenarios, there could be significant releases associated with the pro rata structures. Therefore, in our credit stability cash flow analysis, we may run back-ended losses to determine if the early release of enhancement impairs the credit stability of those notes in a more moderate stress scenario. The back-ended loss assumptions will test the credit stability of the notes based on the proposed payment structure, as well as the available credit and liquidity support.

APPENDIX 1

Questions Considered To Determine Cash Flow Assumptions

45. The nature of the assets and the transaction's structure will determine which types of stress tests and scenarios are appropriate. Certain questions, such as the following non-exhaustive list, are typically considered in determining appropriate cash flow assumptions to support an analysis of the payment structure and cash flow mechanics for a given transaction:
- Are the cash flow mechanics of the structure designed to result in timely payment of interest and ultimate payment of principal to security holders in each rated class under a variety of stress scenarios consistent with the rating assigned to each class? (See paragraphs 1, 6, 10, 13, 14, 16, 18, 30, 31, and 36.)
 - Does the payment waterfall allow for any cash flow "leakages"? Examples include withholding tax or other taxes, step-up interest costs, set-off risk, commingling risk (the risk that the SPE's cash, such as monthly collections, is temporarily or permanently mixed with the cash of a third party, such as the originator), and replacement servicer fees. (See paragraphs 5, 17, and 34.)
 - What is the potential impact of events of default and other "trigger events" on the availability of asset cash flows for payment to rated security holders? (See paragraphs 11, 32, 33, and 38.)
 - If the rated securities are subject to a pro rata structure, and excess spread is paid out of the structure to the extent that it is not needed in that payment period, or if credit and liquidity enhancements are allowed to amortize, is there sufficient credit and liquidity support if asset defaults are concentrated toward the back-end of the collateral pool's life? (See paragraph 42.)
 - How can the asset portfolio yield change over time? Are interest rates on the loans in the pool the same, or are different borrowers charged different rates? Are borrowers entitled to a discount for being able to meet their payments on a timely basis (for example, U.S. student loan borrower benefit programs)? Can defaults or prepayments lead to changes in the weighted average portfolio yield? (See paragraphs 20 and 23.)
 - How can the coupon rate on the liabilities change over time? (The weighted average coupon rate on the liabilities at the start of a sequential-pay pass-through payment structure is usually significantly lower than later in the life of the rated bonds as the more senior bonds pay down.) Are there any step-up margins on the securities? (See paragraphs 30 and 41.)
 - Are there any key service providers to the SPE (such as the servicer) where it might be appropriate to assume a higher replacement provider fee in the event that the primary provider resigns or is removed during the life of the transaction? (See paragraph 34.)
 - What is the timing of any expected recoveries related to when the assets default and relative to the maturity of the rated securities? (See paragraphs 25, 28, and 29.)
 - To what extent could prepayments affect the overall credit profile of the pool and leave a higher

proportion of less creditworthy borrowers in the pool? (See paragraph 22.)

- To what extent could prepayments or defaults cause the transaction to be over- or under-hedged, or trigger termination payments to a derivative counterparty? (See paragraphs 35 and 61.)
- How are transaction fees calculated? For instance, are they a basis fee equivalent of the SPE's outstanding asset or liability balance, or are they an absolute fixed amount? Fixed amount fees may appear insignificant at the start of a transaction, but can become a more significant yield drain as the securities pay down. (See paragraph 30.)
- If the fees are variable, on what are they based? For example, in a residential mortgage pool, is the servicing fee based on the outstanding balance of the mortgage loans, the total liability balance, or a facility limit, rather than its drawn amount? If the servicing fee is based on the note balance and there are points in time that the SPE is holding significant amounts of (typically low-yielding) cash, there may be increased stress on yield sufficiency. (See paragraphs 30 and 34.)
- What are the rights of the subordinate noteholders and equity holders? If the asset performance starts to deteriorate, do these security holders continue to receive interest on the face value of their investments or on some written-down value? Do subordinate noteholders benefit from being able to draw on liquidity or credit enhancement facilities? (See paragraphs 57, 58, and 59.)
- Can principal receipts be used to pay interest coupons? If so, how far down the capital structure is this feature available, and how likely and where in the payment waterfall will it be recouped in future periods? (See paragraph 39.)

APPENDIX 2

Additional Asset Considerations

46. Some loan and lease contracts may have specialized payment terms that are specific to their asset type. For example, European commercial real estate loans may have interest-only periods, U.S. student loans may have minimum payment periods, and U.S. auto leases typically have optional residual payments at the end of their terms. Negative amortization, in which unpaid accrued interest is capitalized (added to the loan principal balance), is a common feature in student loans that are in deferment or forbearance status. This feature can also be found in certain residential mortgage loans. In our cash flow analysis, we account for the specific payment streams generated by the pool of assets as dictated by the characteristics or contractual terms of the assets.
47. For revolving assets that do not amortize based on a predetermined payment schedule, we typically model a payment rate assumption in our cash flow analysis to capture interest and principal collections from the assets. These assets include credit card receivables, dealer floor plan loans, and Japanese consumer loans. We assume a stressed payment rate in our cash flow analysis, with lower payment rates at higher ratings. For certain revolving assets, such as credit card receivables, the purchase rate is an important cash flow assumption that determines the rate at which new receivables are added to the pool. This, in turn, drives the generation of additional principal collections. As the purchase rate increases, more collections are likely to be available to accelerate the paydown of the securities during an amortization period.

48.

If the pool consists of structured finance securities, such as a CDO backed by RMBS, we generally use the expected amortization schedule of the pool to estimate cash inflows to the SPE. The amortization schedule is based on the expected maturity profile of each security in the pool.

49. For financial future flow assets, including diversified payment right and merchant voucher receivables, we generally apply a haircut to historically observed cash inflows, with the haircut based on debt service coverage ratios that are more stressful at higher rating categories. For future flow securitizations backed by operating assets, such as marine cargo containers and railcars, we generally apply asset-specific stresses that are designed to reduce the cash flows generated from the assets. Some examples of these stresses include fleet utilization, lease rate, and operating expenses.
50. For a collateral pool that is revolving, such as an actively managed CDO or a personal loan ABS with a revolving period, we generally assume that the pool composition will drift to the worst credit quality as allowed by the eligibility criteria governing the transaction. We may make an exception in the case of managed CDOs in which the collateral manager pledges to maintain the initial pool's credit quality. If the eligibility criteria do not outline a clear worst-case scenario, then we may run several stress scenarios.

Additional Structural Considerations

Excess spread

51. Our cash flow analysis takes into account the structural mechanisms by which losses are absorbed by enhancement and the capital structure. Excess spread is usually the first line of defense if it is available. It is typically defined as interest collected from the collateral minus senior fees and bond coupon payments. Principal recoveries may be included in the definition of interest collections for certain dealer floorplan and credit card transactions. To the extent that excess spread is positive each period, it is available to cover losses for the period that would otherwise be allocated to other forms of enhancement, such as a reserve account, overcollateralization, or subordinate tranches of the capital structure.
52. If there is excess spread remaining after covering losses, the excess spread may either be released to the residual interest holder (usually the seller or depositor) or be used to increase a reserve account or overcollateralization (by paying down additional bond principal) to a target level. Enhancement targets are used to trap excess spread and prevent its release to the residual interest holder. The targets are embedded in the payment waterfall in the principal payment step to build overcollateralization, or in the reserve account deposit step to build to a reserve target. Once the target is reached, additional spread will be released to the residual.
53. If the transaction has an enhancement floor, releases will stop once the floor is reached. In a rating scenario analysis, it is unlikely that the enhancement target will be achieved, because excess spread will be needed to cover losses rather than to build to the target. In a credit stability analysis, an enhancement floor can ensure that a minimum amount of fixed enhancement is present. To the extent it is achieved in the cash flow scenario, a floor can confer a deleveraging benefit that boosts loss coverage levels and allows for greater credit stability.
54. If excess spread is negative because the interest collections generated by the assets are insufficient to pay fees and bond interest ("negative carry"), principal collections may be used to pay the shortfall amount. However, using principal collections for this purpose will reduce the amount available to pay bond principal and potentially result in a write-down amount if there is insufficient credit enhancement. Certain transactions mitigate negative carry with

overcollateralization that can be written down and/or a cash reserve account that may be drawn on to cover the interest shortfall. Some auto loan ABS transactions utilize a yield supplement to reduce negative carry risk. A yield supplement boosts asset yield by rediscounting low interest receivables at a higher rate or providing a cash account earmarked for yield.

Reserve account

55. A cash reserve account can be designed for several purposes. It can be used to absorb principal losses (credit risk), cover interest shortfalls (liquidity risk), make priority principal payments, and pay note principal at legal maturity. The account may be funded at issuance, or it may be unfunded initially but increase to a target amount by trapping excess spread in the payment waterfall.
56. A reserve account may be established for the benefit of all the notes in the capital structure, or it may be specifically designated for a given tranche. For example, reserve accounts in credit card ABS rely on excess spread for funding in addition to an initial deposit, which is why they are also called "spread accounts." These accounts may typically be drawn to pay interest on one or more designated subordinate tranches. The senior tranches typically do not benefit from the spread account because they can rely on principal reallocation from the subordinate tranches to mitigate liquidity risk from interest shortfalls.

Subordination

57. In the event that all forms of credit enhancement (excess spread, cash account, overcollateralization, third-party support) are exhausted, any additional losses will be borne by the notes based on their seniority in the capital structure, with the most junior notes being affected first. Certain asset classes, such as auto loans and residential mortgages, typically do not write down the par value of the notes until their legal final maturity. Instead, the pool balance is allowed to decline below the note balance, which causes parity to fall below 100% and the notes to be under-collateralized. This shortfall is usually tracked in RMBS transactions with a principal deficiency ledger. Bond interest continues to accrue on the par value of the notes, which creates an extra burden that can be addressed with an interest reprioritization mechanism in the payment waterfall.
58. Certain asset classes, such as manufactured housing, may use write-down structures to allocate losses. These structures reduce the principal balance of the notes to match the pool balance if the pool balance declines below parity with the notes.
59. Credit card ABS transactions generally take a hybrid approach to write-downs. Generally, defaults and collections are allocated to individual series of a master trust based, in part, on the notes' invested amount, or nominal liquidation amount, which is usually defined as the total note balance minus all principal deficiencies, unreimbursed write-downs, and principal payments or accumulations to date. However, the cumulative write-down amounts are not recognized until legal maturity, such that bond interest continues to accrue based on the notes' full par value instead of their reduced invested amount. In addition, credit card transactions that are structured as de-linked master trusts typically limit the invested amount of subordinate notes that can be written down for allocation purposes, based on the percentage of subordinate notes encumbered to senior notes.

Supplemental analysis

- 60.

For transactions with a "money market" tranche, which typically has a short-term rating and final maturity date of 12 months (or up to 397 days in the U.S.), we may stress the timing of principal receipts in our cash flow analysis of this tranche. For example, we may apply a zero default rate assumption and model a stressed level of delinquencies, or we may apply a front-loaded default curve but lengthen the assumed recovery lag (see paragraph 28). We may also apply a zero or low prepayment rate assumption in our cash flow analysis for this tranche.

61. If hedging instruments are not balance guaranteed and instead decline on a preset schedule, the transaction risks becoming under-hedged (which occurs when the pool and notes amortize slower than the notional amount of the hedge) or over-hedged (which occurs when the pool and notes amortize faster than the notional amount of the hedge). In either case, the transaction may be subject to excess spread compression under various interest rate scenarios. This risk should be modeled in the cash flow analysis.

REVISIONS AND UPDATES

This article was originally published on Oct. 9, 2014. These criteria became effective as of the publishing date, except in markets that require prior notification to, and/or registrations by, the local regulator. In these markets, the criteria became effective when so notified by S&P Global Ratings and/or registered by the regulator.

Changes introduced after original publication:

- Following our periodic review completed on Oct. 5, 2016, we updated the contact information and removed sections related to the initial publication of the criteria.
- Following our periodic review completed on Sept. 20, 2018, we updated the contact information.
- On June 25, 2020, we republished this criteria article to make a nonmaterial change. We added a "Related Guidance" section to provide transparency regarding the existence of cash flow guidance that appears in guidance documents related to asset-specific criteria.

RELATED PUBLICATIONS

Superseded Criteria

- Aircraft Securitization Criteria: The Servicer's Role And Responsibilities, Sept. 1, 2004
- Cash Flow Modeling For Manufactured Housing Transactions, Sept. 1, 2004
- U.S. Residential Subprime Mortgage Criteria: Structural Considerations For Subprime Mortgage Transactions, Sept. 1, 2004

Partly Superseded Criteria

- European Consumer Finance Criteria, March 10, 2000 (in relation to the analysis of credit card ABS)

Related Criteria

- Global Derivative Agreement Criteria, June 24, 2013
- Criteria Methodology Applied To Fees, Expenses, And Indemnifications, July 12, 2012
- Principles Of Credit Ratings, Feb. 16, 2011
- Methodology: Credit Stability Criteria, May 3, 2010
- Understanding S&P Global Ratings' Rating Definitions, June 3, 2009

Related Guidance

- Guidance: Global Methodology And Assumptions For Nonfinancial Future Flow Transactions, Jan. 16, 2020
- Guidance: Global Methodology And Assumptions For CLOs And Corporate CDOs, June 21, 2019
- Guidance: Global Equipment ABS Methodology And Assumptions, May 31, 2019
- Guidance: Global Methodology And Assumptions: Assessing Pools Of Residential Loans, Jan. 25, 2019

These criteria represent the specific application of fundamental principles that define credit risk and ratings opinions. Their use is determined by issuer- or issue-specific attributes as well as S&P Global Ratings 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.

Copyright © 2020 by Standard & Poor's Financial Services LLC. All rights reserved.

No content (including ratings, credit-related analyses and data, valuations, model, software or other application or output therefrom) or any part thereof (Content) may be modified, reverse engineered, reproduced or distributed in any form by any means, or stored in a database or retrieval system, without the prior written permission of Standard & Poor's Financial Services LLC or its affiliates (collectively, S&P). The Content shall not be used for any unlawful or unauthorized purposes. S&P and any third-party providers, as well as their directors, officers, shareholders, employees or agents (collectively S&P Parties) do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Parties are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, for the results obtained from the use of the Content, or for the security or maintenance of any data input by the user. The Content is provided on an "as is" basis. S&P PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs or losses caused by negligence) in connection with any use of the Content even if advised of the possibility of such damages.

Credit-related and other analyses, including ratings, and statements in the Content are statements of opinion as of the date they are expressed and not statements of fact. S&P's opinions, analyses and rating acknowledgment decisions (described below) are not recommendations to purchase, hold, or sell any securities or to make any investment decisions, and do not address the suitability of any security. S&P assumes no obligation to update the Content following publication in any form or format. The Content should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. S&P does not act as a fiduciary or an investment advisor except where registered as such. While S&P has obtained information from sources it believes to be reliable, S&P does not perform an audit and undertakes no duty of due diligence or independent verification of any information it receives. Rating-related publications may be published for a variety of reasons that are not necessarily dependent on action by rating committees, including, but not limited to, the publication of a periodic update on a credit rating and related analyses.

To the extent that regulatory authorities allow a rating agency to acknowledge in one jurisdiction a rating issued in another jurisdiction for certain regulatory purposes, S&P reserves the right to assign, withdraw or suspend such acknowledgment at any time and in its sole discretion. S&P Parties disclaim any duty whatsoever arising out of the assignment, withdrawal or suspension of an acknowledgment as well as any liability for any damage alleged to have been suffered on account thereof.

S&P keeps certain activities of its business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain business units of S&P may have information that is not available to other S&P business units. S&P has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

S&P may receive compensation for its ratings and certain analyses, normally from issuers or underwriters of securities or from obligors. S&P reserves the right to disseminate its opinions and analyses. S&P's public ratings and analyses are made available on its Web sites, www.standardandpoors.com (free of charge), and www.ratingsdirect.com (subscription), and may be distributed through other means, including via S&P publications and third-party redistributors. Additional information about our ratings fees is available at www.standardandpoors.com/usratingsfees.

STANDARD & POOR'S, S&P and RATINGSDIRECT are registered trademarks of Standard & Poor's Financial Services LLC.