

Creditreform Rating AG Rating Methodology

SME CDO Securitizations



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1 Introduction

This document presents the methodology employed by Creditreform Rating (referred to as Creditreform or CRA) for evaluating collateralized debt obligations backed by a large, granular, and homogeneous pool of loans (SME CDOs, CDOs). These loans may include various asset types, such as residential and commercial mortgages, corporate loans, and other structured finance instruments. Typically, the debtors in such credit agreements are small to medium enterprises (SMEs) or self-employed individuals.

In evaluating the credit risk associated with CDO transactions, Creditreform considers multiple factors beyond the credit quality of the underlying loans, the diversification of the loan portfolio, the structural features of the transaction, and the legal and regulatory framework that governs the transaction. Market and economic analysis play a crucial role, enabling an assessment of macroeconomic conditions, industry trends, and market outlooks to gauge potential impacts on the loan portfolio and the overall performance of the CDO.

Moreover, historical performance data of similar CDOs and loan portfolios is reviewed to identify patterns, trends, and potential risks, enhancing the credit evaluation process. CRA also places significant emphasis on risk management and risk mitigation strategies implemented by the loan sponsor/originator.

Creditreform assesses the CDO's adherence to regulatory standards, transparency obligations, and legal frameworks to ensure regulatory compliance and mitigate associated risks.

2 Rating indication and process

2.1 Rating indication

The object of the rating process is to arrive at a reliable and appropriate risk assessment in an efficient and consistent manner. The approach focuses on the objective of ensuring the quality and integrity of the rating process and maintaining consistency in our decision-making process.

CRA employs a distinct rating scale for structured finance, including SME CDOs. Unlike bond and corporate ratings, these ratings carry the "sf" suffix.

| Rating category | Rating | Assessment |
|-----------------|--------------------|--|
| AAA sf | AAA _{sf} | Highest level of credit quality, lowest investment risk |
| AA sf | AA+ _{sf} | Very high level of credit quality, very low investment risk |
| | AA _{sf} | |
| | AA- _{sf} | |
| A sf | A+ _{sf} | High level of credit quality, low investment risk |
| | A _{sf} | |
| | A- _{sf} | |
| BBB sf | BBB+ _{sf} | Highly satisfactory level of credit quality, low to medium investment risk |
| | BBB _{sf} | |
| | BBB- _{sf} | |
| BB sf | BBB+ _{sf} | Satisfactory level of credit quality, medium investment risk |
| | BB _{sf} | |
| | BB- _{sf} | |
| B sf | B+ _{sf} | Moderate level of credit quality, increased investment risk |
| | B _{sf} | |
| | B- _{sf} | |
| C sf | CCC _{sf} | Low level of credit quality, high or very high investment risk |
| | CC _{sf} | |
| | C _{sf} | |
| D sf | D _{sf} | Insufficient level of credit quality, total loss of investment |
| NR | Not Rated | Rating temporarily suspended, i.e. liquidation in process |

2.2 Data requirements and preliminary analysis

Initially, CRA analyzes the relevant SME CDO structure and gathers relevant information on the economic, business, and legal environment. Documents and loan-level data shall be provided by or on behalf of the originator. In addition to the parameters of the transaction and data on the composition of the current pool, CRA may request historical performance data of comparable CDOs or portfolios from the originator's loan book. CRA seeks tables detailing the historical use of funds, the downstream structure, and historical default and loss data of comparable portfolios, preferably in static vintage form.

If the portfolio includes secured loans, CRA will request information on the collateral and review both the structure of the collateral portfolio and the historical performance. Based on the extent of documentation received, CRA conducts plausibility checks and may seek legal opinions when necessary.

3 Rating methodology

3.1 Structural analysis

3.1.1 Static vs. managed CDOs

CDO transactions can be categorized as static or managed. While in static CDO transactions, the underlying loans and their parameters are determined at the transaction's inception, a managed CDO transaction allows the sponsor to replace existing loans in the portfolio within predefined limits and eligibility criteria specified in the issuing documents (e.g. prospectus).

The documents typically outline the eligibility criteria, including a replenishment period that permits loan replacements and establishes portfolio parameter thresholds that the sponsor must adhere to throughout the transaction.

CRA accounts for the increased uncertainties by adjusting current portfolio parameters towards adverse portfolio compositions of replenishments within given limits and thresholds.

Further considerations encompass the sponsor's ability to manage the portfolio effectively, adhere to the defined eligibility criteria, and mitigate risks associated with loan replacements. Specific considerations may include the sponsor's track record in loan selection, risk management practices, and the overall stability and expertise of the management team.

Regular monitoring ensures the sponsor's compliance with the defined eligibility criteria and portfolio parameter thresholds, allowing for timely identification of any deviations or potential risks that may affect the rating assessment.

3.1.2 Amortizing vs. bullet loan portfolio

CDO transactions typically incorporate both amortizing and bullet loans based on the sponsor's business model. Amortizing loans involves regular principal and interest payments, reducing the loan balance gradually. Conversely, bullet loans only require interest payments during the term, with a lump sum principal payment at maturity.

While amortizing loans decreases risk through partial redemptions, these funds may be used to purchase additional assets during a replenishment period, introducing portfolio composition uncertainties. Furthermore, bullet loans combined with low-credit quality debtors can elevate credit risk compared to amortizing loan profiles.

CRA uses amortization schedules in its proprietary cash flow model to thoroughly assess risk and cash flow dynamics, enabling the evaluation of expected loan cash flows considering principal payment timing and amounts. Section 3.4.2 provides more information about CRA's sensitivity analyses.

3.1.3 Credit enhancement mechanism

Credit enhancement mechanisms play a pivotal role in SME CDO transaction structures, aiming to offset cash flow shortfalls from various risk sources. Their main goal is to enhance the CDO transaction's credit quality, reducing risks for investors. Commonly used mechanisms include liquidity reserves, principal deficiency ledgers, over-collateralization, soft maturities, tranching, and waterfalls. CRA examines these mechanisms in SME CDO transactions, assessing their impact on cash flows and risk profiles. This evaluation combines quantitative and qualitative assessments.

3.1.4 Asset-liability mismatch

An asset-liability mismatch (ALM) arises when the cash flows generated by the underlying loan portfolio do not align with the cash flows required to meet interest and principal payments on the CDO notes.

One type of ALM occurs when the interest payment schedules of the underlying loans and the CDO notes are not synchronized. This can result in a situation where the cash flows generated by the loan portfolio may not be available to meet the interest payments on the CDO notes. Mismatches can also occur when the maturities of the CDO notes do not align with the maturities of the underlying loans in the portfolio, which can lead to a situation where the CDO notes mature before the underlying loans, and potentially expose the underlying loans to market value risks.

3.1.5 Pro-rata vs. sequential priority of payments

A priority of payments (PoP) is a fundamental structural feature within a CDO transaction that governs the distribution of cash flows generated by the underlying loan portfolio to the various tranches of CDO notes. The distribution can be pro-rata and/or sequential, or a combination.

Pro-rata distributions proportionally allocate cash flows based on each tranche's share of the total principal amount. Sequential distributions, however, prioritize senior tranches thereby increasing their relative loss buffers. A structure may also switch from pro-rata to sequential (or vice versa) due to trigger events, which are typically applied to achieve and maintain certain threshold values for senior tranches. The trigger events typically refer to certain loss or dilution levels within the portfolio.

Pro-rata PoPs are typically vulnerable to late-stage losses (e.g., back-loaded defaults), as these have limited cash flow potential due to the remaining portfolio size. This risk is also present if a threshold for sequential payments is set too high.

3.1.6 Commingling risk

Commingling risk in a CDO transaction involves the potential risk associated with the commingling of collections on the originator's or servicer's collection accounts. Typically, the originator continues to collect payments on accounts held in its name, which might be regarded as insolvency estate and potentially lost temporarily or permanently.

This risk can be mitigated by limiting the duration of payments held on this account and enforcing minimum credit quality conditions for the originator/servicer.

3.1.7 Trigger events

CDO transactions commonly feature trigger events, which become effective on significant deterioration of the transaction's risk profile. They act as safeguards and initiate changes in the transaction structure to safeguard noteholders. Trigger events may typically be categorized as performance-based trigger events and counterparty-related trigger events.

Performance-based triggers relate to the underlying portfolio's performance. For instance, if defaults in the securitization pool surpass a set limit, it can activate a performance trigger, end a loan replenishment phase, change the priority of payments, or initiate an increased amortization schedule.

Counterparty-related triggers depend on the performance of involved transaction parties, such as the servicers. If a transaction party fails to meet a required rating, it can activate a counterparty trigger,

leading to the current servicer's replacement. This ensures transaction continuity and reduces disruptions from underperforming parties. CRA evaluates the impact of trigger events carefully.

3.1.8 Eligibility criteria

Parties initially set quality criteria for the purchase of loans, which outline the acceptable characteristics and risk profile.

Concentration limits concerning the total portfolio can be defined which must be complied with during the term of the transaction. The seller is responsible for ensuring new receivables meet these criteria and typically guarantees their compliance upon transfer to the portfolio. Often, loans are purchased through a randomized selection, which minimizes adverse selection and origination biases.

If the criteria are breached, the seller may either repurchase the non-conforming receivables or provide a suitable substitute. Non-compliance, including deteriorating values within the portfolio, may lead to actions like early redemption of issued notes. From the investors' perspective, eligibility criteria should serve to mitigate risk.

Eligibility criteria often pertain to loan or lease terms, payment history, legal jurisdiction, receivable status, insurance coverage, debtor and geographical concentrations, adherence to the originator's guidelines, interest rates, profit margins, balloon payments, residual value limits, and historical default rates. Within the framework of the analysis of the structure of the transaction, CRA assesses the eligibility criteria and portfolio restrictions for their risk-mitigating effect.

In analyzing the transaction's structure, CRA evaluates the criteria and portfolio restrictions for their risk-mitigating impact.

3.1.9 Legal considerations

Starting from the analysis of the transaction's structural features, CRA will analyze the complexity of the issue and deduce potential risks associated with the envisaged structure. This check is based on an analysis of the transaction documents (term sheet, prospectus, related contracts, etc.). The relevant contracts, terms sheets and/or legal opinions are typically created by specialized attorneys; relevant contractual documents and legal opinions are examined by CRA. If potential risks related to the transaction's legal structure become apparent, the analysts will state their assessment of these risks. A discussion of legal aspects does neither constitute a legal opinion of CRA nor will secondary legal opinions be created internally. Although CRA forms an opinion about these documents, no additional

legal examination will be conducted. In addition to transaction-specific legal risks, regulatory risks in the broader sense are assessed and will be included in the analysis as part of the issue rating.

3.2 Operational analysis

3.2.1 Sponsor/originator

Typically, the originator is the initiator and uses securitization to refinance and generate facilities for new business. We evaluate the originator's underwriting standards, which include acceptance and quality criteria of the underlying contracts, documentation requirements, and scoring processes. We also review operational aspects concerning debt collection methods, cash management capacities, IT systems, and internal controls. We also contextualize current and past changes in collection methods and recovery processes with historical data to assess their predictive power. Understanding the originator's default definition is essential for accurate default data analysis and future predictions. CRA assesses and adjusts for the impact of definitions to ensure data comparability.

Since a default during the transaction may lead to significant risk to the enforcement of obligations (e.g., set-off risks, collection disruption, creditor termination rights), we also assess the originator's credit quality.

Risk management

In the rating process, CRA evaluates the originator's risk management policy, emphasizing adherence to established market standards. Key risk management practices that CRA considers include robust internal controls, comprehensive underwriting procedures, regular monitoring of credit quality, reporting, and proactive identification and mitigation of potential risks.

3.2.2 Counterparty risk

Counterparty risk refers to the risk associated with one or more parties involved in a CDO transaction failing to fulfill their obligations, potentially resulting in losses for investors. CRA recognizes the importance of mitigating counterparty risk and considers measures such as collateralization, credit enhancements, and contractual provisions designed to protect investors in the event of a counterparty default.

CRA evaluates counterparty creditworthiness using a robust method that includes financial strength, credit ratings, past performance, and other key indicators, facilitating an effective assessment of their ability to meet obligations.

CRA continuously monitors counterparties during the CDO transaction, enabling prompt detection of any creditworthiness deterioration that could influence the overall rating.

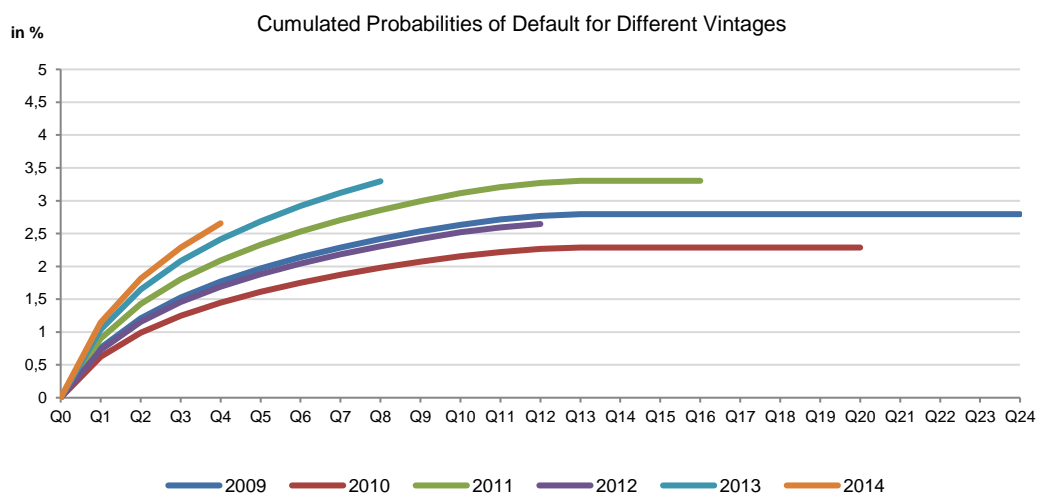
3.3 Portfolio and credit risk

3.3.1 Probability of default

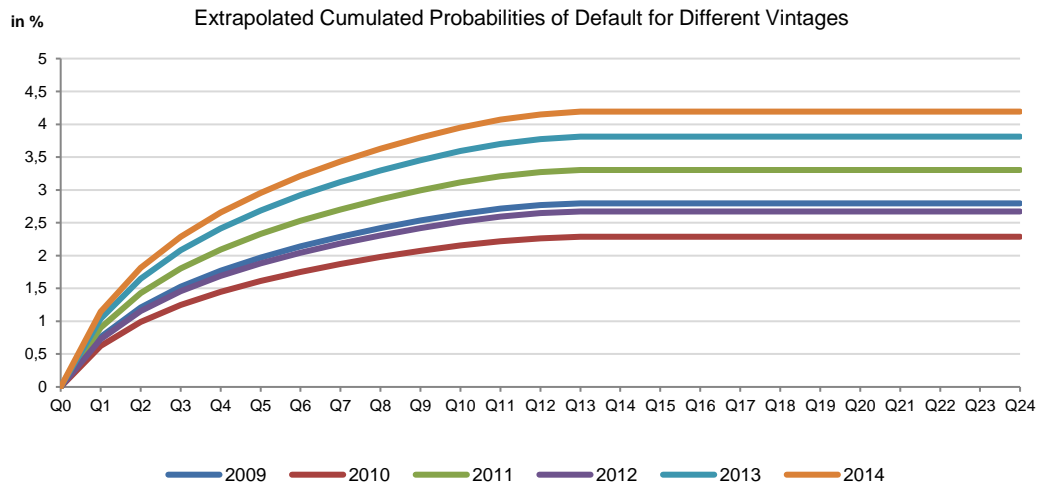
Vintage curves

Historical performance data is usually provided in the form of static pools (“vintages”). These are related to a specific origination date and are often provided on a monthly or quarterly basis. Static data sets are particularly suitable for forecasts on the performance of new portfolios or similar assets.

The following chart shows a static data set in vintage form, plotting the amount of defaulted loans or leasing contract volumes over time relative to the total volume originated. Time series of younger vintages contain data, which are correspondingly shorter since the contracts have a shorter history.



If complete data series are not available, the missing periods must be extrapolated. Extrapolation is done by examining the average change in the cumulative default rates for similar asset pools. Data from other originators may also be used if the product under review is new and has no predecessor, and if the characteristics of the product have changed significantly or the data have not been documented. In this case, the same structure is assumed for all years. The extended data set is presented as follows:



Extrapolation, with the result those individual years, especially recent ones can deviate from the average; can amplify existing volatilities and differences in trend. CRA examines the causes of such deviations and incorporates the results of the analysis into the rating.

The average of the extrapolated cumulative defaults from the static pool of contracts is the starting point for deriving base case default rate assumption. CRA considers both the average seasoning and the average maturity of the underlying loan portfolio based on the eligibility criteria. This is important because loans have higher marginal default probabilities in earlier years, which decrease as a contract matures.

Subsequently, CRA may adjust the base case default probability assumption, thereby taking into account development trends, differences in the composition of the pool, asset age, changes in servicing standards or underwriting criteria, as well as potential changes in exogenous factors such as the general economic environment.

Originator Rating Systems (Migration Matrices)

Another approach to derive a default probability assumption is by utilizing data from the originators' internal rating systems, which are often provided in the form of migration matrices spanning multiple years of historical data. Originators employ their proprietary credit models to classify loans and estimate future default probabilities.

This method is particularly useful in generating default expectations for the current loan portfolio and for additional loan contracts acquired during a revolving period. During such periods, eligibility criteria may require the purchase of loan contracts with a minimum internal rating.

Deriving cumulative default rates using migration matrices involves discretion in terms of model selection, such as the choice of a time-homogeneous Markov chain approach, and adjustments. While this approach provides valuable information, it is essential to consider that it places less emphasis on extrapolated forecasts compared to vintage analysis. As a result, there may be significant differences in the outcomes derived from these two approaches.

Financial Ratio Analysis

For smaller, non-granular, and heterogeneous portfolios, CRA may also analyze company financial statements and financial ratios.

3.3.2 Recoveries

Historical Recoveries

CRA conducts a comprehensive evaluation of historical recovery data sets using e.g. vintage curve extrapolations as laid out in section 3.3.1. and analyzes the distribution of recovery rates. This approach is primarily applied to unsecured loan portfolios (portions).

Collateral Analysis

For portfolios with loans that are secured with collateral, CRA may apply collateral-specific recovery rate approaches. Collateral can be tangible assets like real estate or machinery, and financial collateral, including guarantees, letters of credit, or cash. Loans that are secured with collateral, typically exhibit higher recovery rates.

For real estate collaterals, CRA applies haircuts to market values to obtain rating-specific recovery rates and accounts for transaction-specific characteristics by evaluating the dispersion of the loan-to-value (LTV) within the underlying loan portfolio. A homogenous portfolio, where the collateral and loan characteristics are relatively consistent, may exhibit a lower dispersion of recovery rates compared to a more heterogeneous portfolio with the same weighted portfolio LTV. Thus, the dispersion of LTVs can affect the potential recovery rates of the underlying loan portfolio. In addition, CRA analyses recovery periods and how recoveries are distributed over time.

3.3.3 Correlation

Our analysis focuses on evaluating default correlation within a portfolio, whereby CRA examines geographical, industry, and borrower concentrations. Geographical and industry concentration risks are vital as they connect an underlying loan portfolio to systematic risk, meaning that a portfolio heavily concentrated in specific regions or industries can be vulnerable to external shocks or economic downturns affecting those areas or sectors. Moreover, a high borrower concentration within a portfolio raises idiosyncratic risk. Depending on the granularity of the portfolio, CRA usually applies a correlation coefficient ranging from 5% for highly granular portfolios with a large number of individual assets to 20% for less diversified portfolios with a smaller number of assets.

3.3.4 Prepayment rates

Prepayment rates in a CDO transaction refer to the early redemption of principal by the borrower of an underlying loan before the scheduled maturity date. These prepayments can occur when borrowers choose to refinance their debt or repay the loan earlier than expected. The occurrence of prepayments can affect the interest income received from the underlying loan portfolio.

When a borrower prepays a loan, the investor of the CDO notes receives the principal payment earlier than anticipated, i.e. the prepayment amount can no longer default, which reduces the default risk associated with an underlying loan portfolio. However, the investor also loses future interest payments that were expected to be received over the remaining life of the loan, thus affecting the overall returns. Prepayment rates introduce a dual impact between reduced default risk and forgone interest income.

Another important consideration regarding prepayment rates is the potential yield compression within the portfolio, where borrowers with high interest rates are more motivated to prepay their loans, leading to a decrease in the overall yield of the portfolio.

Additionally, borrowers with favorable credit creditworthiness may choose to prepay their loans as they have more options to access alternative funding sources. Borrowers with lower creditworthiness may choose to preserve their available funds for other business activities, potentially increasing the credit risk within the underlying loan portfolio.

To assess prepayment behavior, CRA typically analyzes historical data from predecessor CDO transactions or the specific history of the CDO transaction under review. These data sets are evaluated in the context of macroeconomic conditions, allowing CRA to derive empirical high and low prepayment rates.

3.3.5 Undrawn credit facilities

Undrawn credit facilities represent the unused portion of credit lines available to borrowers within the underlying loan portfolio. While undrawn credit facilities may not currently contribute to the cash flows of the transaction, they can have implications for the overall risk profile and performance of the CDO. CRA reviews the potential impact of undrawn credit facilities and incorporates them into the analysis.

The presence of undrawn credit facilities provides borrowers with additional liquidity and financial flexibility, which can affect their ability to meet their obligations and the overall creditworthiness of the transaction. As such, CRA assesses the terms and conditions of these facilities, including their size, availability, and expiration dates, to evaluate the potential future drawdowns and their impact on the cash flows and risk profile of the CDO.

3.3.6 Interest rate risk

CDO transactions may use hedging tools like swap agreements to counteract interest rates or currency risks that influence cash flows over the transaction's duration. CRA evaluates the impact of these hedges on cash flow and the associated counterparty risk (refer to 3.2.2). Interest rate risk in CDOs stems from spread and reference rate discrepancies between the CDO notes and the loan portfolio.

3.3.7 Currency risk

Currency risk may be significant in CDO transactions with assets denominated in various currencies. Exchange rate fluctuations can affect CDO note performance and cash flows, particularly if the CDO notes and underlying assets differ in currency, leading to conversion uncertainties for principal and interest payments. CRA assesses this risk by considering the portfolio's currency exposure, exchange rate stability, and their potential impact on the transaction's performance and creditworthiness. Currency hedging strategies may be used to manage this risk and stabilize cash flows and returns.

3.4 Cash flow analysis

3.4.1 Approach

CRA's cash flow model incorporates key elements of the transaction, including costs, fees, interest rates, repayment schedules, credit enhancements and tranching, triggers, and payment priorities. The goal is to accurately assess asset-generated cash flows concerning the issuer's payment obligations. For rating purposes, we introduce stress factors to test cash flow stability and evaluate the risk on payments across different tranches.

3.4.2 Stress factors and sensitivity analysis

CRA derives rating level-specific stress assumptions for relevant parameters, where higher rating levels correspond to higher stress and higher loss assumptions. Within a sensitivity analysis, we specifically focus on testing the individual and combined effects of our stress assumptions on the transaction performance, including the timing of losses.

4 Continuous monitoring and follow-up rating

Our analysts continuously monitor the issue to ensure the rating remains valid. They maintain contact with key parties involved in the transaction and evaluate relevant data. The rating is reviewed annually or when significant events affect the issue's quality.