Creditreform Rating AG Rating Methodology

Rating of Financial Instruments

(Issue Ratings)

Neuss, July 2016
Version 1.3

Creditreform Rating

Table of Contents

1 INTRODUCTION 2

2 SCOPE OF APPLICATION 3

3 RATING RESULT AND PROCESS 3

3.1 RATING RESULT 3
3.2 DATA REQUEST AND PRELIMINARY ANALYSIS 5
3.3 MANAGEMENT INTERVIEW 6
3.4 RATING COMMITTEE 6

4 RATING METHOD 7

4.1 STRUCTURAL RISKS 9
4.1.1 Analysis of the transaction structure 9
4.1.2 Type of collateral and debt seniority 9
4.1.3 Revolving period, ramp-up 11
4.1.4 Covenants and trigger events 11
4.1.5 Country-specific and industry-specific risks 12
4.1.6 Legal Considerations 12

4.2 OPERATING RISK 13
4.2.1 Originator and servicer 13
4.2.2 Asset manager 13
4.2.3 Counterparty risks 14

4.3 CREDIT AND PORTFOLIO RISK 14
4.3.1 Asset and credit quality 14
4.3.2 Portfolio structure analysis 15
4.3.3 Eligibility criteria 15
4.3.4 Credit enhancement 16

4.4 CASH FLOW MODELLING 16
4.4.1 Simulations 16
4.4.2 Recovery rate analysis 17
4.4.3 Scenario-based stress tests 18

5 CONTINUOUS MONITORING AND FOLLOW-UP RATING 18

This document (v1.3) updates an older document while preserving its basic methodological approach. Certain statements were more precisely worded. The update was carried out in July 2016.

1 Introduction

Over the past 15 years, Creditreform Rating AG (“CRA“), established in 2000, has become one of Europe’s leading rating agencies.

In this document, CRA discloses its rating methodology for financial instruments in order to provide the parties involved, investors and the wider public with the opportunity of developing a deeper understanding of the mechanisms behind its ratings. This document will be regularly upgraded to reflect any changes in our methods and philosophy. The CRA rating methodology and Code of Conduct can be freely accessed on our web page (www.creditreform-rating.de).

This document will describe our procedure of performing an issue rating. In contrast to corporate ratings, issue ratings refer to specific financial instruments such as a bond or a promissory note loan. Such financial instruments are commonly issued by corporations or special-purpose vehicles, and their proceeds will be invested – individually or as elements of a wider portfolio – into an investment universe that is defined in the terms and conditions of the relevant issue. Financial instruments can be covered by collateral or backed by individual assets whose cash flows and / or disposal proceeds could, in the event of a default, be used to satisfy the claims of the creditors. Quite frequently, these collateralized assets also serve as the issuer’s cash-generating entities, allowing him to make the interest and principal payments to which his creditors are entitled. Traditional corporate bonds, conversely, are not collateralized in the same way. For these cases, the system of performing issue ratings which is explained in this document will be complemented with further documents.

Creditreform’s issue ratings are performed by taking into account all available and relevant information in order to quantify the risks of the issue at hand. CRA arrives at its conclusions by applying a rating method that combines different analytical approaches. In contrast to CRA’s corporate ratings, issue ratings place a specific emphasis on debt seniority and collateralization as well as on the contractual and structural elements of the emission under review. These dimensions complement the quantitative analysis, representing an independent focus of their own.

Issue ratings represent well-informed assessments of a given emission’s “credit quality“. They issue no recommendation of whether or not to purchase, sell or hold financial instruments. Neither are they legal opinions, and they provide no independent valuation of the future market values of individual assets and / or investments in the issuer’s possession.

2 Scope of Application

This document on the system for the **Rating of Financial Instruments (issue ratings)** defines the framework for the analysis on which such issue ratings are based. Issue ratings refer to specific financial instruments such as corporate bonds or promissory note loans.

Accordingly, this system has been designed to distinguish between issuers with operating activities of their own (commercial enterprises) and special-purpose vehicles ("SPVs"). It will also be taken into account whether the cash flow meant to service the financial instrument under review will be generated directly by the returns of an operative business or indirectly by underlying investments / instruments. Thirdly, we need to take a closer look at the collateral that is being offered. The question, at any rate, whether collateral is provided directly in the form of assets or indirectly in the form of claims under the law of obligations (creditor claims) is not of immediate relevance. Our assessment of the credit quality and the quality of the assets portfolio, of asset management and servicing, however, is of particular importance when asset-backed securities are involved. The rating system which is explained in this document covers all these different cases.

The rating of a financial instrument must therefore be distinguished from a **corporate rating**, which uses a range of defined criteria to assign the company under review to a certain rating category. Although the rating of the issuer is of specific relevance for uncollateralized bonds (such as corporate bonds) – because such a rating allows a detailed assessment of operating and credit risks – issue ratings generally require the consideration of additional factors including capital structure (different levels of debt seniority), collateralization mechanisms and transaction-specific particularities such as credit enhancements. Corporate ratings and the ratings of financial instruments that have been issued by these corporations proceed, as a rule, along different lines. It is therefore not possible to derive issue ratings directly from an existing corporate rating.

If and inasmuch financial instruments are issued in the form of structured tranches, the CRA **Rating System Structured Finance** shall be applicable.

3 Rating Result and Process

3.1 Rating result

The CRA rating system is designed to provide answers to the fundamental question of whether and to what extent the issuer will be able to meet his future financial obligations fully and on time. We analyze whether the anticipated cash flows will be sufficient to service the debts and to meet all of the financial instrument's various payment obligations. Issue ratings therefore represent the

agency’s assessment of a specific financial instrument’s credit quality, predicting whether or not the investors are likely to suffer a loss during the term of the instrument under review. While the rating result exclusively refers to the financial instrument under review, the analysis also provides an assessment of the business model and the planned investments / underlying instruments, without, however, explicitly communicating these individual results (the “look-through approach“).

Any performance of a rating needs to be based on a clear definition of a default event. The CRA definition of a default has been essentially derived from the definition of the “Basel Committee on Banking Supervision“. Any given financial instrument is in default, when the issuer in question is highly unlikely to meet his credit obligations. According to this definition, any loss larger than zero is equivalent to a default (“first Euro loss“). Possible causes for such an event include insolvency or the liquidation of the issuer as a financially liable party or guarantor. If a default has been defined in this way, the insolvency of the issuer is not automatically linked with the default of the financial instrument that he has issued, since cash flows or recovery rates may still be generated (particularly within collateralized or asset-backed structures) that can cover the outstanding nominal debt including due interest and coupon payments either in full or in part. This is why – for collateralized and asset-backed financial instruments – the possible result of the liquidation process is explicitly taken into account for the purposes of defining a default. A collateralized financial instrument is therefore considered to be in default when it is highly unlikely that contractual payment obligations will be met in full after the collateral has been liquidated.

For its issue ratings, Creditreform uses a rating system that assigns every instrument to one of the internationally standardized rating categories, ranging from AAA to D. The issue ratings take into account the level and the specific characteristics of the collateralization and the structural features of the financial instrument under review. The instrument is then assigned to one of the following rating categories, based on its credit quality:

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

Especially in the event of an insolvency or a liquidation of the issuer or following disruptions in the performance of the financial instrument (missed payments / non-compliance with contractual credit servicing obligations), the rating will be qualified with the letter “D“ for default. This default will refer to the issuer or to a failure of meeting debt servicing obligations in connection with the financial instrument under review.

CRA rating reports are compiled by teams that comprise at least two analysts. Our clients can directly approach these teams during the entire rating process and the subsequent monitoring period. The ratings themselves are determined by the Rating Committee.

3.2 Data request and preliminary analysis

As a first step, the business model which is relevant for the financial instrument and the planned investments (allocation of resources) is analyzed, and information about the economic and legal environment is acquired. For this purpose, documents that have been provided by the initiator of the transaction or the manager are studied, but so are general data about the relevant markets and industries. The data request serves to procure information about the design of the financial instrument, the allocation of resources and the eventual asset structure as well as the collateralization of the issue. Information about the initiator / manager of the transaction will also be analyzed. Depending on the amount of data that have been provided for the rating analysis, certain analyses will only be conducted in the form of sample-based plausibility checks to verify the quality and consistency of the data. All data will be treated confidentially.

3.3 Management interview

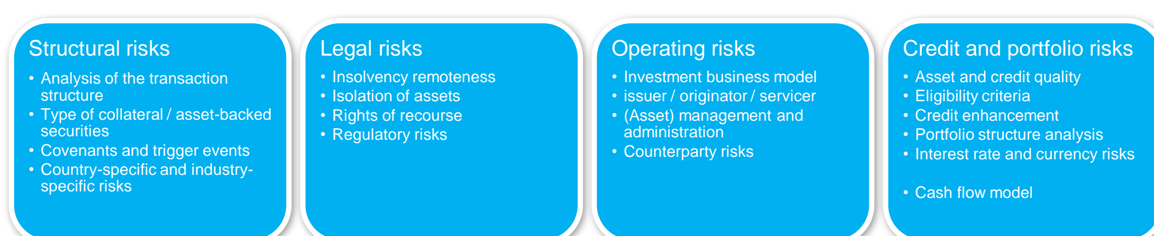
The management interview – conducted with the initiator / manager of the transaction and, if applicable, with other parties that have been involved in the transaction – is meant to underpin the information from the submitted documents with context and added facts. Qualitative as well as quantitative factors are discussed. Specific attention will be dedicated to establishing and assessing the financial strength of originator / manager, the investment strategies, experience and background of the executives, the historical track record and performance as well as the tools and capacities required for a profitable portfolio management. The quality of the collateral and the extent of the creditors‘ rights of recourse under rules, regulations and contracts will also be separately taken into account in individual cases, mainly to limit the creditors‘ exposure to the risks of complex and multi-tiered transactions.

3.4 Rating Committee

The analysts will then condense the results of the analyses from the rating process into a recommendation for a specific rating. They will submit this recommendation alongside their comprehensive Rating Report to the Rating Committee, the final arbiter and highest instance of the rating process. The Rating Committee alone is entitled to determine and change the actual ratings. It serves to ensure objective assessments of a (technically as well as formally) high quality and guarantees the application of fair and even standards.

4 Rating Method

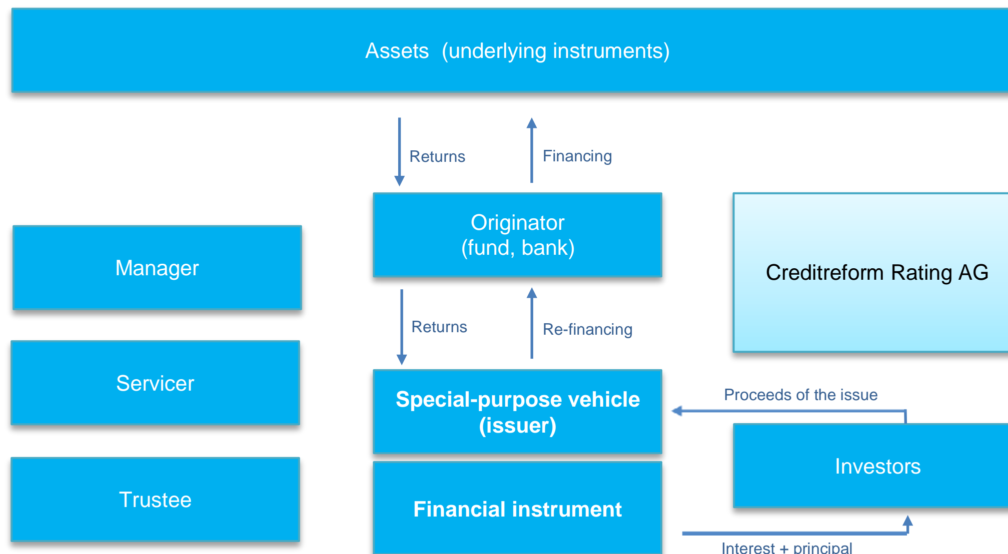
Bearing in mind the fact that the individual properties of transactions are liable to affect credit quality as well as financial strength and influence the rating accordingly, Creditreform Rating analyzes all the different risk factors of the transaction under review. The rating team weighs the individual factors in consideration of the requirements and specific characteristics of the transaction before condensing their assessments into a Rating Report which is then submitted to the Rating Committee. Both quantitative and qualitative analyses are performed for the rating of any specific financial instrument. These analyses focus on the following risk factors:



The transaction structure and the resulting cash flow quality are subjected to qualitative analyses which have a significant relevance for the rating process. Strengths and opportunities of the transaction are analyzed, for example reserves or other collateralization instruments. Certain contractual stipulations for trigger events or high levels of financial strength on the part of the originator can have a positive impact. These positive factors are then correlated with the weaknesses and risks of the transaction – for example, the implications of an issuer's default, high asset-related risks or low levels of diversification in the portfolio of loans or claims. The qualitative analyses are based on the analysts' knowledge of the industry and their general skills in forming informed opinions.

Creditreform is applying different rating approaches and analytic techniques, alone or in combination, depending on the individual features of the financial instrument, the way in which the transaction reflects these features and the extent to which the issue is aligned with the overall business model. Issue ratings will also include cash flow analyses to determine how likely it is that contractually mandatory payments for the financial instrument under review will be made in time. Plausibility checks of the opportunity-risk profile will include scenario analyses for individual cases to see how the cash flows would respond to certain induced stress factors. Depending on the structural levels of complexity in general and, more specifically, the quantitative or qualitative structural dimensions of the investments and the collateralized assets, the scenario analyses can assume different forms (see 4.5).

A typical (simplified) transaction structure would look like this:



With the proceeds of the issue, the special-purpose vehicle (SPV) will purchase assets (investments). The originator, for example a (loan) fund, a bank or a holding company, can use such a transaction to acquire resources in order to provide financing to third parties (for loans or shares in larger loan schemes, infrastructural assets, property etc.) or to re-finance previous financial arrangements. In this document, we shall refer to these purchases as “underlying instruments“, in contrast to the “assets“ that have been acquired by the SPV in the context of the issue and which may include equity investments in the form of shares in the fund. The assets of the SPV are – through different collateralization strategies – linked to the values of the underlying instruments (see 4.1.2 Type of Collateral).

In fund transactions, the manager is responsible for selecting target investments and for the completion of due diligence procedures, the build-up of a portfolio and the ongoing risk management. The originator in such cases is a fund that re-finances itself by selling its shares to the SPV. It is equally possible that the SPV provides financial resources on its own account. A servicer may supervise the flow of payments, debt collection operations and possible escalation procedures in the event of delayed payments or the default of a debtor. He will forward any incoming payments to the SPV. If the transaction is overseen by a trustee, this trustee shall monitor the payment flows on behalf of the investors. Commonly, he also manages the accounts. The investors shall receive the interest and principal payments to which they are entitled under the agreed terms of the transaction.

4.1 Structural Risks

4.1.1 Analysis of the transaction structure

By analyzing the structure of the transaction and redemption payments, the key structural features of the transaction that have a positive or negative impact on the performance (and the returns on the investment) are revealed. Bearing in mind the wide range of possibilities for the construction of financial instruments and the large number of asset classes that are open to potential investments, it is impossible to compile a comprehensive list of all such features, but the most important ones include the following: priority of interest and principal payments for the securities under review, the type of collateralization and the possible existence of additional securities such as surplus interest income, cash reserves or liquidity buffers (credit enhancement); the existence of guarantees and hedging mechanisms; defined trigger events that would alter the flow of payments; constraints, conditions and similar mechanisms (covenants, eligibility criteria); and call or redemption options (early redemption, call / put options). The effectiveness and performance of these features will be assessed and taken into account for the purposes of modelling the transaction.

Additional criteria include restrictions concerning the type of investment that can be made and the type and individual character of any collateralization. Since issue ratings are issued for a specific financial instrument, other structural aspects – such as contractual maturities and debt rankings with a view to both origin and application of funds – may also need to be taken into account.

4.1.2 Type of collateral and debt seniority

Type of collateral

In order to allow the investors to assess the risks of the financial instrument (their potential losses in the event of a default), the rating process will establish whether or not the financial instrument has been collateralized. If the financial instrument under review has been collateralized, the rating will need to take the following into account:

- Who is providing the collateral? Is this the issuer himself, or do the investors have a right of recourse to third-party / substitute collateral, for example guarantees that have been provided by another legal person?

- Are the investment assets used as underlying instruments in the collateralization, which could imply that they do not directly cover any creditors' claims?

- Collateral can be provided in various forms, for example as tangible assets, shares (in a company or a fund) and debt. Collateralization may be provided through single or multiple assets from diverse industries including property, infrastructure, logistics and energy generation.

- Funds can be invested into loans, either covering the entire loan or a share of a larger loan, following which interest and principal payments will be used to meet the payment obligations that are connected with the financial instrument. The analysis will have to assess whether or not the investors – in the event of a default or sustained under-performance – will have recourse to the collateral of these loans (whether they are the sole creditors or a party in a larger consortium), i.e. the underlying assets.

- Collateral and underlying instruments can be in the possession of legally independent entities. Underlying investments are quite frequently at the project stage, which means that the potential performance of an investment must be assessed as a separate project with a cash flow of its own. This can refer to existing assets as well as to projects in a stage of development.

The assessment of collateralized assets is based on the internal analysis of collateralization elements and external evaluations, specifically in the event of tangible assets. The type, the form and the construction of the collateralization arrangement (the collateralized underlying instruments) as well as their resulting intrinsic value must therefore be considered for the purposes of an assessment of the credit and portfolio risk (see 4.4). The analysis will also need to establish whether and to what extent the creditors of the financial instrument under review would have a right of recourse to any proceeds from the liquidation of the collateralized assets and / or the returns or cash flows (receivables from loans) of the collateralized underlying instruments under the specific terms of the collateralization if the issuer defaults on his payment obligations. Correspondingly, the type of collateralization can represents an “enhancement“ of an issue, ensuring – taking into account structural considerations – a more positive assessment of credit quality and financial strength than would otherwise (without such a collateralization) have been the case.

The assessment of financial instruments that have *not* been collateralized or otherwise covered by claims under the law of obligations, by guarantees or by substitute collateral, will be exclusively based on the reliability of the issuer’s cash flow from operating activities and the issuer’s (or originator’s) expected revenue as the only possible source for the servicing of the debt. In these cases, the already existing rating of the issuer will be used to assess operating and credit risks. The rank (seniority) of the financial instrument will also be highly relevant in any evaluation of the issue under review.

Debt seniority

If the analysis reveals that the creditors of an issue cannot rely on a full and exclusive collateralization, other structural features of the financial instrument under review must be closely scrutinized. In the event of a default, the cash flows from the liquidated collateral will be made available or the creditors may assert their claims on the returns of the collateralized underlying instruments. This is why the analysis must take into account the maturities and specifically the

rankings of the individual claims and loans. If the rating explicitly applies this category of analysis, there is no longer the assumption that a “single class of debt“ exists with uncollateralized financial liabilities of equal rank.

On the one hand, an analysis to reveal the source of funds will identify the rank of the financial instrument within the issuer’s framework of debt categories and establish whether a factual collateralization structure can be derived from that. Based on our issue rating method, we assume that the financial instrument has been issued alone and in a single tranche and that it represents the issuer’s sole debt instrument for the entire duration of its term. Cases where financial instruments are structured and issued in several tranches are discussed in the CRA paper on the methods for structured financing arrangements. The rating analysis therefore does not have to take into account the existence of different debt categories, although “payment waterfalls” may be determined by the terms or conditions of the issue under review.

On the other hand, any assessment of the risks involved in the acquisition of securities will have to take into account that – concerning the allocation of resources – the investment pool can contain equity as well as debt assets or a mix between the two. The ranking of payment flows and the individual creditors must therefore be considered. Taking into account the aforementioned constellations, the analysis establishes which proportion of a given cash flow will be made available to service the contractual obligations of the financial instrument under review.

4.1.3 Revolving period, ramp-up

In issue ratings, the structure of the transaction frequently specifies a time frame during which a credit portfolio will be gradually built up, allocating investments to specific periods over time (“ramp-up“). It is also possible to stipulate the repeated acquisition of assets during a specific period (“revolving period“), in contrast to an otherwise static portfolio. The gradual build-up of portfolios or the re-investment of capital returns during the revolving period is, however, frequently combined with the obligation of ensuring that the new assets meet certain criteria, since the investors would otherwise be exposed to the risk of a deteriorating credit portfolio quality, if assets of a lower quality are acquired (see 4.4.3). Such transaction features are considered during the analysis and will be taken into account for the purposes of modelling the transaction-specific cash flows.

4.1.4 Covenants and trigger events

The analysis will also take into account any covenants that have been agreed to complement the conditions of the financial instrument. Typically such covenants include change-of-control or cross-default clauses. In view of possible debt hierarchies under which the financial instrument under review may be subordinate to other instruments, positive declarations and negative declarations must also be examined as part of the analysis.

Transaction agreements often define certain events that can trigger certain actions or results, for example an end of the revolving period or an end of the ramp-up period or the premature redemption of the issued securities. Such trigger events can reduce the requirement for additional collateralization mechanisms and the risks of the transaction. They protect the investors against a deterioration in the quality of the debt portfolio. Defined trigger events can, for example, determine certain reactions to a decrease in the financial strength of one of the parties, a violation of contractual obligations ("covenants"), a depreciation of the collateralized assets ("credit enhancement") and the fall of liquidity reserves under certain agreed minimum thresholds as well as limits for default and dilution rates, delays of payment and payment periods. Based on the defined trigger events, worst-case scenarios can be created for the subsequent quantitative analyses.

4.1.5 Country-specific and industry-specific risks

In order to allow the analysis to take into account case-specific (potential) risks, our scenario analyses subject a wide range of parameters to selected stress factors. This can affect the opportunity-risk profile of any given issue. CRA focuses its attention on the following factors:

- General interest rate effects and currency effects
- Asset prices, the prices for underlying instruments and liquidation costs on the secondary markets
- General economic parameters and data
- Data and information about specific markets and industries

Country-specific risks are generally of minor importance for the ratings of collateralized and asset-backed issues. Nevertheless, they are considered as potential risks for the purposes of the scenario analyses.

4.1.6 Legal Considerations

Starting from the analysis of the transaction´s structural features, CRA will analyse 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 specialised attorneys; relevant contractual documents and legal opinions are examined by CRA. If potential risks related to the transaction 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 with as part of the issue rating.

4.2 Operating Risk

4.2.1 Originator and servicer

The issue of financial instruments involves different parties, but the most important part is played by the originator. The originator initiates the underlying claims. An insolvency of the originator during a transaction can create severe risks for the other parties involved, endangering their chances of successfully asserting their claims, which is why these risks must be properly identified and assessed. The originator's business practices concerning the assertion of claims and the provision of loans are an important consideration of all CRA ratings. Selection and quality criteria for the underlying assets as well as concentration restrictions and portfolio limits for revolving portfolios are analyzed and subjected to plausibility checks. The results of these checks and analyses will be reflected by the final rating (see 4.4).

If collateralized assets do not directly serve as cash-generating entities and / or financial instruments have *not* been collateralized while no third party or substitute collateral has been provided, the assessment will go beyond the origins of the claims (underwriting) and the debtor management, focusing specifically on the originator's ability to service the contractual payment obligations from the cash flows of his operating activities. The evaluation of the operating risk in respect of the originator will be based on an analysis of his business strategy and business model, his financial strength and his profit situation as well as on an assessment of his operational capacities. Usually, a separate CRA credit assessment will be taken into account.

The servicer is responsible for the management and administration of payments that are connected with the loan portfolio. Quite often, this role is assumed by the originator himself. The procedures of the claims management, personnel resources and technical resources are important aspects, too. The servicer is in charge of the claims management, including cash flow control, receivables management and arrears management. Servicers can assume additional responsibilities for certain asset classes, for example arranging debt rescheduling and debt restructuring agreements in the event of delayed payments. Any assessment of the servicer's operating risks must therefore take into account his methods of debt collection and the capacities of his cash management system. It must also evaluate the practice-relevant systems and procedures of his debtor management and the quality of his internal control system.

4.2.2 Asset manager

For transactions with a fund structure (for example infrastructure or property funds, alternative investment funds and private debt / equity funds), an asset manager is commonly in charge of planning, due diligence and selection of target investments, controlling the build-up of the portfolio (allocation of resources, diversification etc.) and managing the inherent risks of the asset portfolio. The assessment of the manager will focus on his competence (strategy, team, track record), existing processes and capacities (evaluation, monitoring), and the planned risk management system (risk assessments, portfolio controls etc.).

4.2.3 Counterparty risks

Counterparty risks reflect the financial strength and professional experience of the guarantors and swap counterparties, account-keeping banks and trustees. CRA assesses to what extent these risks could affect the issue. Counterparty risks can, for example, arise through the provision of derivates, credit lines and financial guarantees. They represent risks that may exceed the credit risk of the claims pool. This is why important third parties of the issue are also subjected to an analysis within the rating process, including account-keeping banks and guarantor institutions, insurance companies, swap counterparties and trustees. Any risks (and payable fees) that have been identified will be reflected by the rating.

4.3 Credit and Portfolio Risk

4.3.1 Asset and credit quality

Asset and credit quality of the underlying instruments are assessed in consideration of the asset class to which the cash-generating entities or collateralized assets of the financial instrument belong. A wide range of assets can serve to generate such cash flows or to collateralize investments.

Characteristic features defining the type and the quality of the underlying instruments that are typically considered for the purposes of assessing asset and credit quality include the following:

- Asset / loan type
- Original and residual term, operating period
- Current market value
- Interest rates and amortization profile
- Debt ratio / leverage (according to asset class, such as debt-to-income / DTI, debt service coverage / DSCR, loan-to-value / LTV etc.)
- Internal / external credit ratings of the debtors
- Location, geographic spread
- Asset-specific features

The evaluation of historical asset and credit quality data is performed under the condition that the quality of these data is sufficiently high. If the data pool refers to investments that are comparable with those (standalone or portfolio) investments that are planned for the future, the evaluation can be extrapolated for asset and credit quality forecasts. CRA uses reference data from various sources if no sufficiently relevant or specific data history about the manager or originator can be readily provided.

The credit risk on the asset level (“bad debt risk”) specifies the risk that purchased claims will no longer be serviced during the term of the issue or become subject to massive write-offs. This risk reflects the credit risk of individual debtors or the default risk of individual assets within the portfolio. For the purposes of the credit default simulations (that will be performed at a

downstream stage of the rating process), individual claims or the underlying instruments of the portfolio will be assessed by taking into account their specific default risks. These risks will be calculated through the CRA strategy of determining an individual credit risk depending on the asset class. Both internal comparative data and information from the evaluation of historic performances are taken into account. Following this, the default risks on the level of the individual investments are adjusted accordingly.

Portfolio assets are assessed in terms of their default risks, but also in terms of the possible or probable severity of the loss that they may cause. The anticipated “loss given default” is either estimated on the basis of historical data and internal comparative data or established through a detailed recovery rate analysis (see 4.5.2). Especially for asset-backed securities, this serves to establish whether or not creditor claims can be realistically enforced in the event of a default by a specific asset.

The evaluation of historic performance data for assets and securities allows the derivation of default and loss assumptions, the extrapolation of anticipated trends and the construction of base-case scenarios that will serve as input parameters for the downstream quantitative analyses.

4.3.2 Portfolio structure analysis

CRA also requires an adequate data history about defaults, delayed payments and dilutions etc. for the underlying asset portfolio. In a further step, the empirical analysis proceeds to scrutinize the structure of the portfolio in terms of certain concentrations (individual debtors, industries / segments, countries etc.) as well as historic default rates and dilution rates. The assumptions that have been formed based on this information will then serve as input data for the subsequent qualitative assessment. Analyses of the likely future portfolio structure will be performed by taking into account the (in most cases) contractually agreed eligibility criteria.

4.3.3 Eligibility criteria

At the start of any transaction, the parties will normally agree certain quality criteria (threshold values) that any future portfolio asset will have to meet. The selection of these criteria and values can affect the risk profile of the claims portfolio significantly. It is also possible to determine certain limit values or ratios of the total portfolio that must be continuously respected for the entire term of the transaction. The vendor of the claims must verify their compliance with these criteria when new claims are purchased for the portfolio, and he shall (in most cases) issue an explicit guarantee for the factual correctness of his assertion. Typically, the vendor of the claims is obliged to buy back any claim that has violated the eligibility criteria or to compensate the buyers accordingly. In the event of non-compliance (for example, when the characteristic features within a certain portfolio deteriorate), certain events may be “triggered”, for example the premature redemption of the securities’ full nominal value. Eligibility risks are intended to reduce the risks of

the investors. CRA examines the eligibility criteria and portfolio restrictions as part of its qualitative transaction structure analysis and assesses the extent to which they are actually capable of reducing the investors' risk exposure.

Common eligibility criteria for investments may refer to any of the following: the term of the transaction; the absence of objections, of overdue receivables or of legal disputes; jurisdiction and applicable laws; the ease with which claims may be established and enforced; credit insurance policies; limits for the proportions of individual debtors or certain geographic regions in the overall portfolio; historically low rates of credit losses and delayed payments.

4.3.4 Credit enhancement

The transaction structure of an issue can feature various risk-reducing instruments ("credit enhancement"). The most common such mechanisms include the following:

- Credit loss insurance (ABS-CE police) or ECA insurance
- Interest rate and currency swaps
- Trigger events
- Letters of credit / liquidity facilities
- Overcollateralization
- Letters of comfort / guarantees

CRA examines whether or not these safety mechanisms are appropriate and adequately dimensioned to reduce the investors' risk exposure. We will take into account the results of this analysis for the purpose of modelling the cash flow and, ultimately, for the rating itself.

4.4 Cash Flow Modelling

Based on the analysis of the transaction structure, we design a cash flow model that takes into account the specific features of the issue under review (for example interest rate and redemption, waterfall, credit enhancements etc.). The model is designed to reflect – as accurately as possible – the structure, allowing an examination of the flows of payment that are generated by the collateralized instruments or assets to satisfy the claims of the investors. Depending on the individual model, different stress factors are applied in different ways to test the stability of the cash flows under a range of scenarios, quantifying the risk of the issuer's inability to meet his payment obligations fully and on time.

4.4.1 Simulations

Simulations are specifically useful in cases where investments have been placed in granular credit portfolios or in portfolios of assessable assets or where the collateralized assets (and / or claims from loans) comprise portfolio investments. This can also involve cross-asset-class pools of assets.

The stochastic analyses also include Monte-Carlo simulations of the cash flows from the underlying claims. These simulations vary parameters such as the probability of default (PD), the loss given default (LGD), the recovery rates and the default correlation of the individual assets. They also take into account the values of the claims in question, the redemption structures, the interest rates and the distribution of returns for equity investments. Default probabilities are calibrated (also) on the basis of country-specific and industry-specific risks. PDs and LGDs may be derived from internal evaluations of the originator. It can, however, be necessary to take additional stress factors into account. Default correlations are based on information about the distribution of individual credit risks across different industries and regions, reflecting cluster and concentration risks. Correlation coefficients are derived from internal analyses.

The analysis must also take into account the collateralization mechanisms in order to deliver a fully rounded picture of the bad debt risk. Quantitative simulations are based on the risk buffers that are provided by the collateralization instruments and any additional credit enhancements, for example the loss and default reserves that have been accrued through purchase price discounts when the assets were acquired. Close scrutiny of the relevant contracts will allow CRA to establish what risks are covered by the enhancements. Only a combined view of all these risks can enable us to derive the bad debt risk on the level of the entire portfolio. Creditreform Rating AG calculates the probability for a default of the transaction that has been caused by the credit and portfolio risk, taking into account all transaction-specific features.

The loss distribution of the reference portfolio under review or the cash flow distribution is then established through Monte-Carlo simulations that are based on the parameters described in the above. The portfolio losses in every individual simulation run enable us to derive the frequency distribution and the distribution function of the portfolio losses. The degree of probability with which the actual portfolio losses exceed a certain threshold value (or the degree of probability that the cash flow fails to meet a certain minimum) can be represented as a quantile of the simulation's frequency distribution.

4.4.2 Recovery rate analysis

This approach is prioritized for issue ratings where the financial instrument under review has been collateralized by individual, not readily assessable assets – especially tangible assets – and where the investors' collateral include claims from underlying instruments. These issues will be subjected to a "recovery rating" that establishes whether and to what extent the creditors will be able to enforce their claims in the event of the issuer's default. The quality of the issue is therefore a function of the potential loss given default, and a recovery rate will be forecast for the eventuality of a liquidation. Since in such constellations the anticipated returns from the liquidation of collateralized assets can be correlated to the financial instrument, the loan-to-value analysis of indicative return rates will allow us to predict the severity of a potential loss given default.

The expected loss given default of a financial instrument will be initially established through the ranking within the company or the structure, and risk-adequate discounts will be made based on the loan-to-value calculations, reflecting the design of the collateral and the properties of the collateralized assets. Case-specific scenarios are conducted to determine the opportunity-risk profile, and – once the probability of default has been established – the expected cash flows are subjected to a range of stress factors. This approach enables us to forecast the ultimately expected loss given default. Base-case, best-case and worst-case scenarios are developed, and the break-even point will be derived for a recovery rate of 100 %. The Rating Committee determines which of the various scenarios will provide the basis for the rating result.

In order to support the qualitative rating analysis, case-specific “shadow ratings“ can be performed, based on the cash-flow-generating entities or specific enterprises. These could allow a more precise forecast of the cash flow development in scenario analyses. Collateralizations can have a smaller impact on the rating result than the structures of the SPV under review, if the enterprise in question has an investment grade rating and a stable operating business that can be relied upon to generate an equally stable cash flow to service the financial instrument. A recovery rate approach would, accordingly, be less likely to be applied.

4.4.3 Scenario-based stress tests

The information that has been acquired through the rating process will be used to develop best case, mid case and worst case assumptions about the cash-flow-relevant parameters. This will allow us to subject the cash flow model to scenario-based stress tests and to verify the resilience of the servicing structure. Sensitivity analyses, which examine the stability of the structure through different modifications of the individual parameters, complete the quantitative analysis and enable us to assess the effects of uncertainty and risk. The results will be considered in our overall assessment of the issue.

5 Continuous monitoring and follow-up rating

Once the rating has been released, it is generally valid for the full duration of the monitoring period. During this period, the development of the issue is subject to a continuous monitoring in order to guarantee that the rating stays relevant and up-to-date at any time. For this purpose, the analysts maintain close contact with the client and evaluate incoming information. If important events or developments, which have a positive or negative effect on the economic situation of the company or the quality of the issue, occur within this monitoring period, the rating can be adjusted accordingly.

After the monitoring period has expired, the rating process will normally have to be repeated (producing a “follow-up rating”) for the company to remain in possession of a valid rating. If the company has taken measures within this one-year period that have affected the factors with an impact on its financial strength, the rating can be adjusted accordingly.