

Creditreform Rating AG Rating Methodology

Credit Cards ABS Securitizations

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## 1 Introduction

This methodology outlines Creditreform Rating AG's (henceforth also referred to as Creditreform or CRA) approach to rating credit card ABS securitizations. It also applies to ABS securitizations backed by consumer revolving lines of credit that involve no credit cards.

The ABS transaction is built around a special purpose vehicle (SPV) or trust which issues financial instruments (e.g., bearer bonds) to finance the acquisition of a pool of credit card receivables.<sup>1</sup> In addition to being revolving in nature, the receivables in the pool tend to have short maturities. As the time to maturity of the securities issued generally exceeds the ones of receivables acquired, there are usually repeated purchases of receivables. Therefore, credit card ABS structures tend to be more reliant on the originator's continued ability to sell new eligible receivables to the SPV than RMBS or (non-revolving) consumer ABS structures. This in turn requires the originator keeps cards useful to current and prospective accountholders. Assumptions on cardholders' purchases and, more generally, seller transfers to the SPV are important considerations in credit card ABS securitizations.

The issued financial instruments are generally structured in tranches, which may be senior or subordinated, and are serviced according to a predefined order of priority. The rating of the debt classes is based—among other factors—on the predefined tranching, which takes into account the respective risk profiles. CRA performs ratings on these instruments but does not size the tranches.

CRA credit card ABS ratings are carried out taking into account all available and relevant information in order to quantify the risks of the respective issue. However, the ratings do not constitute a recommendation to buy, sell or hold financial instruments. They are also not legal opinions and do not represent an assessment of the future market values of individual assets or investments.

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<sup>1</sup> For brevity, we henceforth use the term "SPV." However, the statements are meant to apply to trusts as well.

## **2 Rating Indication and Process**

### **2.1 Rating Indication**

The aim of the rating process is to efficiently and consistently arrive at a reliable and appropriate risk assessment. The approach focuses on the objective of ensuring the quality and integrity of the rating process, avoiding conflicts of interest, and maintaining consistency in our decision-making process.

A team consisting of at least two rating analysts is responsible for the credit card ABS rating. This team of analysts is the client's point of contact throughout the entire rating and subsequent monitoring processes. All data obtained by CRA is treated by the agency with confidentiality. The final authority for the rating assessment is a rating committee.

CRA uses the following rating scale for its structured finance ratings. As the rating system for structured finance (which, among others, includes credit card ABS) differs from the one used for bond and corporate ratings, structured finance ratings will be subscripted with the suffix "sf".

Rating category	Rating	Assessment
AAA <sub>sf</sub>	AAA <sub>sf</sub>	Highest level of credit quality, lowest investment risk
AA <sub>sf</sub>	AA+ <sub>sf</sub>	Very high level of credit quality, very low investment risk
	AA <sub>sf</sub>	
	AA- <sub>sf</sub>	
A <sub>sf</sub>	A+ <sub>sf</sub>	High level of credit quality, low investment risk
	A <sub>sf</sub>	
	A- <sub>sf</sub>	
BBB <sub>sf</sub>	BBB+ <sub>sf</sub>	Highly satisfactory level of credit quality, low to medium investment risk
	BBB <sub>sf</sub>	
	BBB- <sub>sf</sub>	
BB <sub>sf</sub>	BB+ <sub>sf</sub>	Satisfactory level of credit quality, medium investment risk
	BB <sub>sf</sub>	
	BB- <sub>sf</sub>	
B <sub>sf</sub>	B+ <sub>sf</sub>	Moderate level of credit quality, increased investment risk
	B <sub>sf</sub>	
	B- <sub>sf</sub>	
C <sub>sf</sub>	CCC <sub>sf</sub>	Low level of credit quality, high or very high investment risk
	CC <sub>sf</sub>	
	C <sub>sf</sub>	
D <sub>sf</sub>	D <sub>sf</sub>	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

As a first step, CRA analyzes the relevant credit card ABS securitization structure and gathers pertinent information, including on the economic, business, and legal environment. Documents and portfolio 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 pool, CRA requests historical performance data. CRA seeks tables detailing the past use of funds, the downstream structure, and historical data on delinquencies, charge-offs, recoveries, yields, payment rates, and purchase rates of comparable portfolios, ideally in static vintage form. If CRA considers the data obtained through the request insufficient, proxy data may be used to augment it (if appropriate).

We strive to review both the structure of the collateral pool as well as the historical performance of similar pools.

Furthermore, information related to the originator and servicer of the transaction is analyzed, as is that of other counterparties. Depending on the scope of the documents provided, plausibility checks are made and, so deemed appropriate, legal opinions will be requested.

### **2.3 Management Meeting**

In the management meeting, the rating analysts discuss the transaction with representatives of the arranger (and, possibly, other parties involved) based on their review of the submitted data and documents. Generally, we raise both qualitative and quantitative issues. CRA's questions may concern: The allocation of responsibilities, operational procedures, and organizational structure at the originator-servicer; the credit standing of the parties relevant to the transaction; the historical track record and performance; card products and origination channels; credit scoring, underwriting, and fraud prevention; and the tools and capacities in-place with respect to portfolio management, servicing, account management, and work-out processes. The rating analysts may also inquire about issues more closely related to the credit card ABS securitization's structure (e.g., planned hedging instruments, external credit enhancements, or loss and liquidity reserves). If the rating is unsolicited, there may be no management meeting.

### **2.4 Rating Committee**

In a rating committee, the team of analysts assigned to the rating presents their findings. Subsequently, the committee determines the rating, taking into account the results of the quantitative and qualitative analyses. Lastly, CRA publishes the rating—following its classification and commissioning—as either “private” or “public”. A rating with a regulatory background must be commissioned as “public”, which means it must be disclosed to the ESMA authority (but such designation does not imply the rating must be published).

## **3 Rating Methodology**

A rating for a credit card ABS securitization consists of several analytical steps. In addition to examining structural, legal, regulatory and operational risks, it includes in particular an analysis of the credit quality and portfolio risk of the credit card receivables about to be securitized.

The information and assumptions drawn from the analyses will be subjected to various stress scenarios in a cash flow model to examine the stability of the transaction under circumstances of economic stress. Details specific to the transaction such as revolving periods, trigger events, internal and external credit enhancements, swaps, etc. are taken into consideration. The results of the cash flow studies are subsequently condensed and included in the rating assessment.

In a typical transaction, an SPV facilitates the securitization of credit card receivables or other consumer revolving lines of credit. It acquires such receivables or other assets from (usually) a single originator. Due to the revolving nature of the portfolio, typically the SPV intends to make repeated purchases and is therefore reliant on continued origination by the seller. The purchases will be financed through the issuance of bearer bonds or other financial instruments (or sometimes via other means such as borrowing). Master trusts are a common structural feature of credit card ABS transactions. With a master trust, an SPV can issue multiple note series and collateralize these note series with a single pool of receivables.

In case of a "true sale" of the receivables, the SPV becomes their owner with rights of disposal. The servicer is responsible for collecting payments and for transferring cash flows to the SPV as well as for the management of delinquencies, defaults and recoveries. In the context of credit card securitizations, it is common that the servicer is a bank that manages card accounts in their entirety. If the transaction incorporates trustees, they will monitor the cash flows in the interest of the investors and will usually hold the accounts as well.

Most credit card ABS transactions feature several phases (such as a revolving period, an amortization period, and an accelerated amortization period) with distinct rules on the usage of available funds at the SPV level. The financial instruments issued are usually structured into tranches. Typically, following an early-amortization event, the payment structure is strictly sequential according to the pre-defined seniority of the tranches. However, in the phases prior to such an event, some pro-rata elements in the priority of payments are not uncommon.

### 3.1 Transaction Features and Structural Risks

#### 3.1.1 Legal Considerations at the Issuer Level

CRA will review risks related to the transfer of the receivables to the issuer and the issuer's legal structure. Among other things, we examine the following key questions:

- Is there a "true sale" transfer of the pool of assets from the originator to the SPV?
- In addition to a true sale, what other provisions exist to shield the SPV from an insolvency of the originator (e.g., separateness covenants)?
- Does the SPV incorporate valid and enforceable features to prevent its own insolvency (e.g., limited-recourse, non-petition, and subordination criteria)?

Our understanding of the presence and effectiveness of such structural characteristics will inform the subsequent quantitative analysis. Note that the transaction documents (term sheet, prospectus, related contracts, etc.) and related legal opinions and documents are the focus of our inspection. These documents are typically prepared with the involvement of specialized lawyers. CRA forms an opinion about them, but no additional legal examination will be conducted. If potential risks related to the transaction's legal structure become apparent, the analysts will state these in their assessment. However, such statements do not constitute a legal opinion of CRA. In addition to transaction-specific legal risks, we examine regulatory risks more broadly. Findings will be taken into account in our issue rating.

#### 3.1.2 Credit Enhancement

While credit enhancement forms a key part of typical credit card ABS transactions, it can be provided by a wide variety of means. Hence, the credit-enhancement features discussed in the following cannot be considered all-encompassing. Of course, if other credit-enhancing mechanisms are present in a transaction, CRA will study their performance implications, too. In European and UK credit card ABS transactions, excess spread, subordination, and overcollateralization are among the most important credit-enhancing mechanisms, with excess spread generally being relied on particularly strongly.

As stated above, this methodology applies to transactions that are structured in the sense of incorporating subordination. When the assets exceed the outstanding amount of a specific class of notes by virtue of subordination that provides some protection for that particular class against losses on the assets. Related sources of credit enhancement are over-collateralization,



reserve funds (e.g., liquidity reserves or first loss reserves), and account pledges (e.g., through a letter of credit).

Gross excess spread refers to the difference between the yield on the asset pool and the sum of the running interest costs on the notes and other costs and expenses. Net excess spread is obtained by deducting charge-offs from gross excess spread. In many credit card ABS transactions, net excess spread is positive during economic expansions. Such a positive excess spread may constitute credit enhancement as it can provide some protection against rising losses on the pool of assets (triggered, for example, by a deterioration of the economic environment). CRA will carefully model the extent to which the rating object can rely on excess spread in different scenarios. In that context, we evaluate not only the level of excess spread provisioned for, but also the transaction's structure, as some structures may fail to capture excess spread to an extent we give credit for (e.g., if pro-rata features of the waterfall cause positive excess spread to largely leak out of a transaction).

### 3.1.3 Order of Priority

Generally, professional transaction documents carefully delineate how available distribution amounts will be allocated to interest and redemption payments on the different classes of notes as well as to other obligations of the issuer (e.g., taxes). CRA will review the relevant provisions meticulously, as these will greatly influence the assumptions and settings made for the quantitative cash flow model. In many transactions, the seniority of one class of notes over another may not hold in every state conceivable. Instead, in some state, redemption payments may be sequential, while in another, they may be pro-rata. Triggers, as discussed in more detail below, are a tool used to control and alter the order of priority.

With a principal deficiency ledger (PDL), some transactions contain a structural feature that serves as a mechanism to prioritize the redemption of notes. For example, receivables charge-offs are recorded as a debit in a PDL that is assigned to a specific note class. In the further course of the transaction, these debits can be offset by credits, which in turn can be used to redeem the corresponding note class. For example, interest payments on receivables can be recorded as credits instead of being paid out as coupons to the noteholders.

#### 3.1.4 Trigger

Triggers define events which alter the priority of payments. The event is often defined in reference to a given threshold. E.g., a three-month rolling average dynamic net loss ratio of 0.5% at a certain payment date could constitute the threshold; if the actual ratio exceeded that threshold at the payment date, it would constitute a trigger breach.

Well-designed triggers reduce the requirements for further collateralization mechanisms as well as the risk involved in the transaction. Determining the extent to which a trigger serves to protect investors from a deterioration of the quality of the asset pool is therefore clearly relevant to the rating process. Further examples of trigger events include a decline in the credit standing of the originator or servicer, a breach of contractual obligations (covenants), the deterioration of existing collateral (credit enhancement), liquidity reserves below predefined limits, and delinquencies and receivables terms (i.e., remaining maturities) exceeding given values.

The consequence of a trigger breach varies from transaction to transaction. In credit card ABS transactions, the breach of a performance-based trigger (such as the dynamic net loss ratio trigger in the example above) may sometimes give rise to a switch from pro-rata to sequential amortization. Instead, if a counterparty fails to maintain a specified credit rating, it might constitute a breach that triggers a collateral requirement or a replacement of the counterparty.

As discussed in more detail in section 3.2.1 below, the originator and servicer are key counterparties in credit card ABS due to the revolving nature of the receivables. Therefore, it is quite common to see both rating-based as well as non-rating-based triggers in relation to the seller. CRA studies the triggers and their implications (as defined in the transaction documents) carefully and considers them when deriving quantitative results.

#### 3.1.5 Revolving Structure, Portfolio Characteristics, and Eligibility

Structures built around the securitization of revolving debt arising under credit card agreements usually include a period within which there is repeated purchasing of receivables (a "revolving period" or "replenishment period"). Credit card receivables' life is typically shorter than that of the issued securities. Furthermore, redemption payments to investors will often

be scheduled with a temporal delay to the issue date. During the revolving period, it is common practice to reinvest principal collections to acquire new credit card receivables. It is conceivable, though, that through these reinvestments, the properties of the portfolio (with respect to parameters such as charge-off rate, portfolio yield, etc.) change such that it becomes less desirable as collateral of the rated securities.

A transaction may incorporate certain triggers to reduce the likelihood of that happening. For example, when the originator becomes insolvent, it becomes unlikely that he will be able to continue to supply credit card receivables that represent good credit risks. Therefore, many transactions feature a trigger in which an originator insolvency will cause an early end of the revolving period.

A pool of credit card receivables can be replenished in several ways. For one, the SPV may purchase new receivables arising from credit card accounts that had already been subject to a transfer from the seller to the SPV in the past. For another, the SPV may purchase receivables from new accounts. In order to maintain a constant portfolio balance, the addition of new accounts may be necessary, as existing accounts are affected by attrition. The latter type of replenishment is almost always, the former often times subject to so-called eligibility criteria. The parties to the transaction initially agree on such criteria, which define a minimum quality standard for newly added receivables, particularly with respect to their risk attributes and performance. From the perspective of the investors, these criteria mainly exist to prevent a deterioration in the quality of the portfolio of receivables due to a deterioration of the seller's origination and servicing practices. Likewise, concentration limits concerning the total portfolio can be defined which must be complied with during the term of the transaction.

The seller is constrained by these eligibility criteria. In typical transactions, he will guarantee to have complied with the criteria when transferring a new receivable to the portfolio. Furthermore, the seller of the receivables usually commits to provide compensation in the event of a breach of eligibility criteria by either buying back the non-conforming receivables or by providing a corresponding substitute or remedy. In the event of non-compliance, events such as an early redemption of the issued notes may be triggered.

Eligibility criteria may, among other things, relate to account seasoning, the absence of defenses or payment delinquencies, the court of jurisdiction and legal framework, status and enforceability of the receivables, hedging by loan insurers, limits for individual debtor concentrations, geographical or card-type concentrations, compliance with the originator's underwriting guidelines, borrower credit scores, borrowers not exceeding the credit limit established in their credit card agreement, and interest rates.

CRA will adapt its quantitative cash flow model such that it reflects the revolving period (if present). When setting up the quantitative framework of the transaction's structure, we also consider the eligibility criteria, the provisions on non-conformance with these eligibility criteria, and portfolio restrictions with regard to their expected risk-mitigating effect. The criteria are likewise taken into account during the empirical analyses for the derivation of base assumptions, as they sometimes imply a minimum threshold for the assumed parameters.

## **3.2 Counterparties and Operational Risks**

### **3.2.1 Originator and Servicer**

The originator—usually a bank or other financial institution—is the initiator of the underlying credit card ABS securitization. He sells the receivables to the issuer for refinancing purposes. In contrast to amortizable receivables such as consumer loans, credit cards provide borrowers with revolving credit lines. Therefore, the performance of the assets is more closely related to the ongoing performance of the originator. For CRA, the underwriting standards of the originator are a key characteristic. Acceptance and quality criteria that need to be met by the underlying credit card loans, documentation requirements, and scoring processes are examined and included in the rating. The scoring process sometimes includes a face-to-face interview with the customer before the data-driven scoring is carried out. An important feature of credit card agreements is that every client account has a credit limit set at inception. The limit is determined by the credit card issuer on the basis of the scoring system and is usually in the low three-digit to mid four-digit range. The limit is subject to regular reviews, which may lead to changes in the limit or even to the credit agreement not being renewed. CRA also analyses the originator's product portfolio. If card operations are part of the originator's core business, this may indicate a better performance in the event of stress. In addition to the credit business,

which involves the issuance of credit cards and the provision of revolving credit lines, many originators also have savings products such as life or unemployment insurances in their product portfolio. These are offered in order to cover the risk of a future customer's inability to repay the credit. It is worth noting that our assessment of the originator serves a dual role. First, it is relevant to our portfolio analysis. Credit risks are often related to the origination channel and underwriting policies targeting different classes of obligors ranging from credit impaired obligors to high-quality customers. Examples of origination channels include retail stores, the internet, and telephone sales. Furthermore, the ability of the originator to provide the transaction with new receivables on an ongoing basis has a direct impact on cash flow. Without the option to reinvest principal collections into the purchase of new credit card receivables, there is a risk funds need to be parked at a negative carry. Second, it helps us uncover potential counterparty risks (e.g., to gain insights into the likelihood of issues with regulatory compliance or failures with regard to representations and warranties).

The servicer is responsible for managing and processing payments from receivables in the portfolio. Typically, the servicer is the same as the originator. In addition to the servicing processes and receivables management, the human and technical resources constitute important aspects of CRA's due diligence. The servicer carries out the administration of the receivables, in particular the management of cash flows, debt collections, management of delayed payments, and, if applicable, collateral repossession. In addition to an increased need for active management by the servicer due to the revolving nature of the transaction, delinquencies and defaults on credit-card transactions are typically high. The ability of the servicer to effectively handle charge-offs, collections, repossessions, etc. directly affects the losses on the pool of securities. Our evaluation of servicer operational risks takes into account the type of payment and debt collection and capacities of cash management, as well as an assessment of the capacity of IT systems involved in debtor management and the quality of internal controlling. Valuable indications related to future performance can be derived from historical data regarding servicing performance and by examining business practices.

A servicer default may have further negative consequences for the transaction. First, following a servicer default, the forwarding of cash flows from the pool of receivables to the issuer may

be delayed. That might pose a challenge from a liquidity perspective. Second, and more importantly, a default of the originator-servicer may give rise to set-off or commingling risks, or both, as discussed in the following.

If CRA considers the servicer to be below average with regard to servicing standards and practices or its creditworthiness, it will evaluate particularly carefully if plans mitigating a servicer default are in place (e.g., the existence of a substitute servicer).

### 3.2.2 Set-off Risks

Set-off refers to the legal process of netting financial claims and obligations between two or more entities, either of which may be a business or a person. Within the context of credit card ABS securitizations, a situation in which set-off can occur is when a client with credit card debt holds deposits with the originator-servicer. If the originator-servicer defaults, the borrower may be able to declare a set-off of his claim against the originator-servicer versus his credit card liability, in turn reducing the outstanding principal amount of the purchased credit card receivable.

In evaluating set-off risks, CRA will take into account the likelihood of the originator defaulting, mitigating structural features such as a set-off reserve account (if present), and the pertinent legal environment.

### 3.2.3 Commingling Risks

After the sale of the receivables to the issuer, the servicer typically continues to receive collections on the receivables in its bank accounts. In the normal course of business, these funds are subsequently passed on to the issuer. However, following the bankruptcy of the servicer, it is conceivable the funds collected on behalf of the issuer are not transferred but commingled with the insolvency estate of the defaulted servicer instead. CRA will assess such commingling risks, taking into account the likelihood of a servicer bankruptcy, potential mitigating structural features, as well as jurisdiction-specific legal aspects.

### 3.2.4 Seller Dilutions

Generally, in credit card ABS securitizations, dilutions adversely affect the principal outstanding of some receivables in the pool. A dilution occurs when the creditor can no longer demand

payment because the consumer has returned the good, has asserted credit card fraud, has been granted a price reduction due to a deficiency in the good purchased with the credit card, has been granted a chargeback, or the like. Note that charge-off and repayment do not meet the definition of dilution. In most transactions, the master receivables sale and purchase agreement (or corresponding document) specifies the seller will have to compensate the SPV for dilutions. In our analysis, we evaluate the risk that the seller is unable to provide such compensation in times of stress. Master trust structures feature a minimum seller's share. To the extent it can be employed to cover dilutions, it does provide a buffer. CRA evaluates the risk-mitigating effect of a minimum seller's share in stress scenarios, some of which may involve a seller insolvency.

### 3.2.5 Other Counterparty Risks

In addition to the analysis of counterparty risks related to the originator and servicer, we consider the creditworthiness and experience of the swap counterparties, collateral providers, appointed account banks, and trustees. Here, we endeavor thoroughly examining all dependencies on the counterparties involved. Counterparty risks arising, e.g., due to the provision of derivatives, credit lines, or financial guarantees constitute risks beyond the credit risk of the pool of receivables. We therefore consider a review of the solvency and credit quality of counterparties such as account banks, guarantors, insurance companies, swap counterparties, and trustees to be an integral part of the rating process.

## 3.3 Asset Analysis and Credit Risks

The analysis of the credit and portfolio risk of the securitized assets is crucial to our assessment of a credit card ABS transaction. To determine the credit quality of the underlyings, CRA evaluates both current and historical data while taking into account the eligibility criteria. Our analysis incorporates key metrics of credit card ABS transactions including expected charge-offs, portfolio yield, monthly principal payment rate (MPPR), purchase rate, and—context-dependent—recovery rate.

The charge-off rate measures the share of credit card receivables outstanding that an issuer writes off as uncollectible. The point at which a receivable is considered uncollectible depends

on the pertinent regulatory environment and, possibly, servicer policies. The credit card accounts of consumers that declared bankruptcy are written off relatively quickly, while accounts of consumers in delinquency are typically written off conditional on the delinquency continuing for a prolonged period of time or conditional on several instalments being in arrears.

The portfolio yield is generally composed of various elements, including annual percentage rate (APR) charges, over-limit fees, and late payment fees. On occasion, it may also include interchange fees. The yield assumption plays a pivotal role in the analysis as it governs the anticipated income available to cover various expenses within the cash flow waterfall.

The MPPR is the rate at which cardholders pay down their balances each month in relation to the total receivables outstanding at the beginning of the month. Higher payment rates may allow the transaction to repay the notes faster during the amortization period.

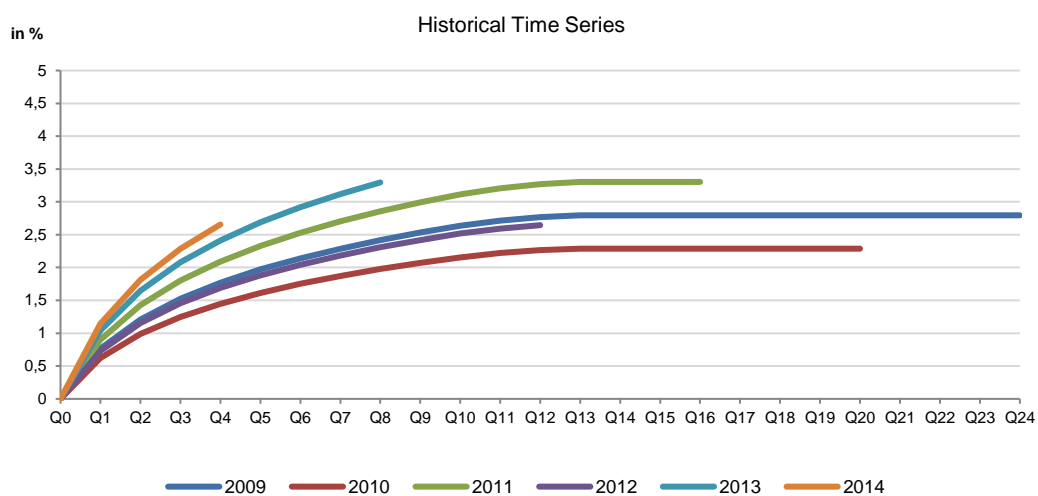
The purchase rate describes the ratio of new receivables acquired in a given month relative to the total principal collections received that month, usually expressed as a percentage. A higher purchase rate can facilitate stabilizing the receivables balance, resulting in increased principal collections over time.

As the revolving credit provided under credit card agreements is unsecured, the ability to generate recoveries from charged-off receivables is sometimes limited. Nonetheless, non-negligible recoveries are possible and, if substantiated by the historical data, taken into account by CRA.

In order to determine the relevant input parameters for the cash flow model, we take the following approach. In a first step, we analyze historical performance data to derive expected values of charge-off rate, portfolio yield, MPPR, purchase rate, and recovery rate. We refer to these as our base case assumptions (or base case parameters). As discussed in section 2.2 above, in that derivation, we might occasionally augment the historical performance data provided by the arranger with proxy data (only if we believe the augmented data set will more accurately reflect the expected future portfolio). In a second step, the base case assumptions are stressed to determine the rating relevant parameters for the cash flow model (see also

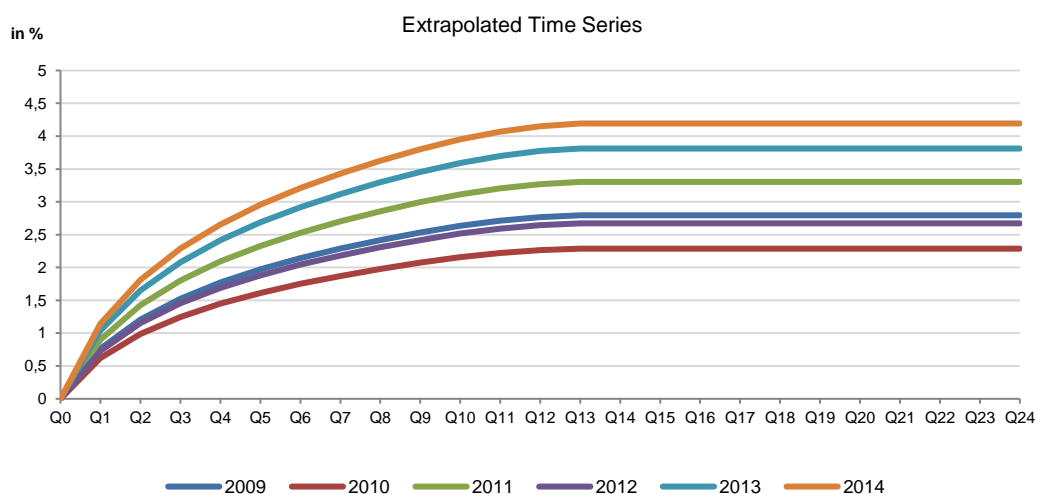


section 3.4). Historical performance data is occasionally provided in the form of static pools (“vintages”). These are related to a specific date and are often provided on a monthly or quarterly basis. Static data sets are particularly suitable for forecasts for the performance of new portfolios or similar assets. The following chart shows a static data set in vintage form, plotting the amount of charged-off contract volumes in relation to the total originated volume over time. The line plots of younger vintages are shorter as they are based on fewer observations.



Source: Own presentation

In case that complete data series are not available, the missing periods need to be extrapolated. Extrapolation occurs by way of examining the average change in the cumulative charge-off rates for similar asset pools. The expanded data set is depicted as follows:



Source: Own presentation

When extrapolating historical data, it is essential to control for exogenous factors in the calculation. In addition, existing volatilities and differences in trend may be enhanced by this process, with the result that individual years, in particular more recent ones, may differ from the average. CRA examines the causes for divergences of this nature and integrates the results of the analysis in the rating.

If static vintage analysis is performed, the average of extrapolated cumulative charge-offs from the static pool of credit card receivables is our starting point for the derivation of the default rate base case assumption. In deriving the base case, we consider the average seasoning of the portfolio. On the basis of further statistical analysis, we determine the one year mean default rate.<sup>2</sup>

In practice, static vintage data of sufficient length and quality may only be available for charge-offs and recoveries, if at all. Thus, for every input parameter that enters our cash-flow model, we have implemented an empirical approach solely relying on dynamic performance data. To that end, we require time series that are sufficiently long (i.e., spanning at least one full business cycle from peak-to-peak or trough-to-trough). CRA calibrates parameters (such as the charge-off rate, yield, etc.) individually. We fit a statistical distribution or model to the data and obtain an expected value of the parameter under consideration. Subsequently, we may use analytical judgment to adjust the parameter based on qualitative considerations. Such an adjustment may be justified with reference to 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.

More specifically, for the portfolio yield assumption, jurisdiction-specific nuances must be considered, as credit card issuers may be subject to interest rate caps, potentially affecting yields, especially when comparing with issuances from other jurisdictions. As yields tend to be volatile as well as pro-cyclical, CRA interprets them with reference to the current level of economic activity. An adjustment of the MPPR may be influenced by the card issuers' minimum payment

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<sup>2</sup> For more information, see also our methodology *Technical Documentation Portfolio Loss Distributions*, v1.0, July 2018.

requirements. Our base assumption for the purchase rate takes into account several factors, including the utility and branding of the originator's credit cards, as well as his financial strength and history.

In a separate analytical step, CRA will examine the portfolio structure with regard to concentrations, the existing aging schedule (the empirical distribution of payment arrears), as well as historical default and dilution rates. E.g., pools with geographical concentrations tend to be more strongly affected by regional economic shocks. The findings from that step serve as input to our quantitative analysis.

### 3.3.1 Interest Risk

The cash flows available to an SPV in a credit card ABS securitization may be sensitive to fluctuations in interest rates. Interest rate mismatches typically arise when portfolio assets and note tranches have different interest rates. Movements in interest rates can pose a risk when significant differences between assets and notes exist in form of a fixed vs. floating mismatch, a basis rate mismatch, or duration gaps between assets and liabilities. Significant risks may also arise due to the volatility of the APRs associated with credit card contracts. APRs can change for several reasons (e.g., due to a change in the creditworthiness of the cardholder or due to regulatory changes). Depending on the nature of the risks present in a specific transaction, either falling or rising interest rates may lead to stress.

CRA pays close attention to unmitigated interest-rate risks, as these might lead to excess-spread compression and, hence, lower CE. The interest rate risk breakdown serves to enhance the cash flow model by providing a consistent analysis to appraise economic stress events. We further elaborate on our approach to modelling interest-rate stresses in the appendix.

## 3.4 Cash Flow Analysis

Based on the analysis of the transaction structure, the specific characteristics of the respective credit card ABS securitization are built into CRA's cash flow model, including things such as costs and fees, interest rate and monthly payment structure, existing credit enhancement (reserves, excess spread, etc.), tranching, triggers, and the order of priority. The aim is to replicate

all relevant mechanisms such that cash flows generated from the assets as well as the payment obligations of the issuer can jointly be examined in great detail. To conduct a rating, CRA will introduce specific stress factors. These are used to construct different rating scenarios with whom we study cash-flow stability and assess the risk of incomplete payment of investors' entitlements within the different tranches.

#### 3.4.1 Stress Factors and Rating Scenarios

We will stress the base case assumptions of expected charge-off rate, recovery rate, yield, MPPR and purchase rate (which we obtained in the preliminary analysis) by applying risk premiums in varying amounts. We refer to these premiums as 'stress factors' in the following. A specific combination of stress factors constitutes a rating scenario. The naming of the rating scenarios follows the rating scale provided in section 2.1 above ('BBB', 'AA', etc.). The rating scenarios vary according to the respective stresses, or premiums, on the base case assumptions ("multiples" and "haircuts"), which increase in scenarios with higher ratings.<sup>3</sup> Using the stressed base case assumptions, the rating relevant parameter values are determined, which will serve as input for the subsequent cash flow analysis.

Qualitative factors—along with our rating definitions—may lead us to choose smaller or larger risk premiums. The determination of stress factors is subject to diligent assessment and approval by the rating committee.

In order to rate a particular transaction with a rating corresponding to a rating scenario, the structure must show sufficient cash flows in the stress case defined by the rating scenario to guarantee the complete repayment of investor claims within the assessed tranche. Creditreform checks whether, when applying the rating scenarios and the implied relevant loss rate, there is ultimately *no* loss occurring. In case of no loss, the assessed tranche passes the stress test.

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<sup>3</sup> Stress factors serve to depict phases of economic downturn and correspond to the risk of the performance remaining below the base assumptions. Stress factors are calibrated under the premise that the corresponding rating scenarios and the expected default rates associated with them will be according to the empirically observed distribution of default in the respective rating category.

### 3.4.2 The Cash Flow Model

CRA models cash flows in consideration of all particularities specific to the transaction as outlined above. As such, we will, for example, take into account the order of priority as well as performance triggers. Based on the targeted interest rate and redemption flows at the beginning of the amortization phase, all costs are included and the tranches (interest and principal) are serviced according to the predetermined priority of payments.

Here, the proprietary Creditreform cash flow model processes assumptions concerning the relevant loss rate (or the charge-off and recovery rates that define the loss rate), the timing of losses as well as the influence of monthly payments, purchase rate and interest rate risk. The cash flow model is the central quantitative tool that allows us to evaluate cash flow stability in a wide range of scenarios. Furthermore, it enables us to depict the influence of a range of rating scenarios on the servicing of financial instruments in much detail and over the entire term of the transaction. For example, for a worst-case analysis, we can feed the cash flow model the worst possible portfolio that is feasible under the eligibility criteria.

### 3.4.3 Scenario-Based Stress Tests

The information gained in the course of the rating process is used to construct sensitivities related to the parameters of the cash flow model. This enables scenario-based stress testing by which the cash flow model, in the context of a particular rating scenario, is subjected to these predetermined additional stress parameters. We investigate their effect on the serviceability of the structure. Furthermore, we conduct sensitivity analyses to quantify the extent to which the stability of the structure is affected by variations in individual parameters. This enables us to assess the robustness of the rating indication for parameter uncertainty. In addition to the stress factors affecting the rating relevant loss rate, CRA may stress other relevant parameters and their impact on the risk profile (e.g., level and timing of monthly payments, timing of defaults and recoveries, interest rates, and portfolio yields).

To determine a rating indication for a tranche, the predefined scenarios are evaluated. CRA investigates whether the claims of creditors to payment of interest and principal can be fulfilled in accordance with contractual obligations.

Some model parameters may be dependent on the seasoning of the pool. Therefore, we consider account seasoning for our sensitivity analyses. The data on credit cards suggests that typically, charge-offs of unseasoned accounts tend to be slightly elevated and may come down somewhat during the first years of the transaction. Therefore, it may be instructive to test whether the structure is robust to a front-loading of defaults (particularly if the pool is unseasoned). However, some structures are designed in such a way that potential credit enhancement may flow out of the transaction if losses are initially low (pro-rata structures). Consequently, it can be instructive to test whether the structure is robust to a back-loading of defaults as well (particularly if accounts are seasoned).

The account seasoning may also influence our view of the portfolio yield. Credit card sign-ups are sometimes incentivized through low teaser rates. Data on unseasoned pools acquired from originators employing teaser rates could hence paint an inaccurate picture of portfolio yield. Another example to deviate from one of our base assumptions is the purchase rate. It is possible that some credit card holders may cease using their credit cards for various reasons, such as economic changes or better card offers from competitors. If we judge such attrition to be substantial, it would warrant applying more stress to the purchase rate.

CRA's quantitative model allows us to stress test front-, even-, and back-loading of defaults, as well as stress tests on the other parameters previously mentioned. Analysts exercise analytical judgment in deciding on which series of stress tests to run based on factors such as account seasoning, length of the programme, length of the note series revolving period, state of the macroeconomy, etc.

The rating report presents the results from the cash flow analysis including findings from the scenario-based stress tests. These findings are discussed extensively in the rating committee.

## **4 Environmental, Social, and Governance factors**

Environmental, social, and governance (ESG) factors are included in our rating. If ESG-related risk drivers have a material impact on the rating, we will make that explicit in the internal documentation as well as the rating report instead of accounting for it implicitly through the

risk drivers' impact on financial variables. In our view, that approach facilitates transparency and allows us to provide information more granularly.

Within the context of credit card ABS transactions, ESG factors may matter at different levels. E.g., it is conceivable that an important counterparty to the transaction is affected by a regulatory risk (i.e., a governance factor); at the same time, it is possible that a risk related to climate change (an environmental factor) matters for the expected performance of the pool of receivables.

CRA provides further details on its approach to ESG-related risks in the basic document "The Impact of ESG Factors on Credit Ratings". This document and the rating methodology related to the issuer-relevant ESG factors are readily available on our website ([www.creditreform-rating.de](http://www.creditreform-rating.de)).

## **5 Continuous Monitoring and Follow-up Rating**

A rating is typically valid for one year. During this period, our team of analysts continuously monitors developments pertinent to the issue. For monitoring purposes, the analysts remain in direct contact with the relevant parties to the transaction while also evaluating relevant information. We strive to ensure, at all times, that the indication provided by the rating is valid. If, during the monitoring period, there is an event with significant effect on the risk profile of the issue, CRA will update its rating.

## Appendix: Interest-Rate Stress

CRA uses deterministic and stochastic approaches to evaluate interest rate risks by stressing the interest rate term structure based on historical volatilities. The starting point of the analysis is the historical evolution of forward rate curves, typically for EURIBOR rates. We use a stochastic model to forecast future developments of interest rates for upward and downward scenarios and for various time horizons. CRA routinely monitors movements in spot and forward rates and updates its rating-specific interest rate stress scenarios periodically.

Figure 1: Example of upward interest rates stress over time for specific rating class | Source: CRA

