# SME ABS Rating Methodology

Structured Finance

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## 1. Introduction

The SME ABS Rating Methodology provides the overall framework for the rating of securitisations of SME exposures. The update contains only minor changes. Consequently, no existing SME ABS ratings will be impacted.

Besides editorial updates, the main change concerns the alignment of the general rules for the large obligor analysis (section 7.1.2.1) with those in the General Structured Finance Rating Methodology following its update.

Scales and definitions of ratings and our Idealised Expected Loss Table are available on www.scoperatings.com.

## 2. Ratings and applicability

This methodology applies to securitisations of granular portfolios of credit rights over small and medium-sized enterprises (SMEs), normally as defined by European Commission Recommendation 2003/361/EC. This methodology can also be selectively applied to SME ABS transactions outside Europe when SME definition and institutional framework are similar.

This methodology supplements our General Structured Finance Rating Methodology by providing additional and more specific considerations for the rating of asset-backed securities (ABSs) backed by pools of loans to SMEs. We consider transactions in the scope of this methodology that securitise portfolios of generally more than 50 effective exposures[1], which are subject to a passive portfolio management approach. Otherwise the CLO Rating Methodology would apply.

We generally see SMEs as sub-investment grade because of they tend to have: i) small size and weak position within their industry; ii) limited diversification in terms of products, geographies, customers and/or suppliers; iii) low efficiency as reflected in modest profitability; iv) a lack of financial sophistication and alternatives; and/or v) key-person risk and the absence of robust corporate governance. We also apply this methodology when larger enterprises are part of granular portfolios, or when medium to large corporates are part of reasonably granular portfolios.

The ratings that we assign to SME ABS instruments reflect the expected loss for an investor on the instrument in the context of the instrument's expected weighted average life (WAL). The expected loss accounts for the time value of money at the rate promised to the investor on the instrument.

## 3. Methodology highlights

**Greater analytical differentiation**. We sequentially analyse the originator, the assets, the portfolio, and the structure, including its legal and counterparty framework. We use a fundamental, bottom-up approach to capture the rating impact of different asset, portfolio or structural characteristics in the context of the originator and the relevant jurisdiction; this avoids the application of one-size-fits-all assumptions. Our analytical approach allows for greater rating and transaction differentiation, even when considering transactions by the same originator and in the same country.

**No mechanistic link to sovereign credit quality**. We do not mechanistically limit the maximum rating a securitisation can achieve as a function of the sovereign credit quality of the country in which the assets are located. Instead, we assess convertibility risk and the risk of institutional meltdown in the context of the tenor of each rated instrument. We factor macroeconomics into the ratings but believe that the credit assessment of a sovereign is not an adequate anchor for a rating ceiling, particularly in eurozone countries.

**Counterparty risk accounting for resolution regime**. We apply our understanding of the various bank recovery and resolution regimes. Traditional counterparty risk analysis and rating trigger schemes that acknowledge these regimes provide significant comfort that roles in the transaction, such as account bank or servicer, can be performed by resolvable financial institutions. This would not compromise or limit the highest rating achievable by a securitisation, provided there is adequate structural protection against losses and liquidity shortfalls.

**Originator analysis**. We leverage on the originator's knowledge of its customers. We analyse the originator's market positioning, product portfolio, origination strategy and policies, risk management and monitoring, and recovery functions in order to build a qualitative framework to develop an informed credit view of the assets. We work closely with our entity-specific analysts in order to

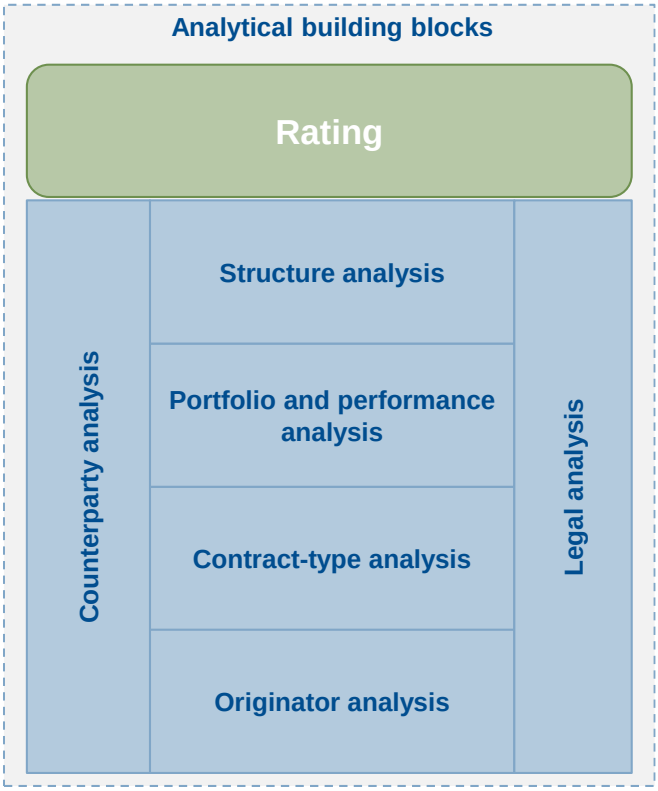
[1] Please see Appendix I.

gain an understanding of the originator's business model and its use of securitisation. The entity-specific analysts also provide us with an additional perspective on portfolio default and recovery assumptions.

**Efficient and flexible rating process**. We can work with data in any proprietary template because originators already produce many valuable metrics for the analysis of credit risk in SME portfolios. Our originator analysis is a key part of the rating process; we ensure that it is efficient and focuses on the points relevant to the securitisation.

## 4. Overview of the analytical framework

Our analytical framework covers six areas: i) originator analysis; ii) contract-type analysis; iii) portfolio analysis; iv) structure analysis; v) counterparty analysis; and vi) legal analysis. All of these are mutually important since our opinion on each analytical block supports the final rating.




The rating we assign reflects the loss we expect an investor to make on a securitisation note. We project and analyse the cash flow available to meet debt obligations in the structure and incorporate our view on the credit quality of the portfolio of assets. Our opinion is forward-looking and uses findings from the originator and asset-type analyses.

We derive assumptions on the securitised portfolio's default rate, correlation and recovery expectation using data from the issuer as well as market data. If the portfolio is highly granular, we construct its default probability distribution using an inverse Gaussian distribution; if the portfolio is exposed to significant concentrations, we derive default distribution by modelling individual loan defaults with Monte Carlo simulations using our portfolio model Scope PM[2].

We integrate the portfolio default distribution using our cash flow model Scope CFM[3], which implements the cash flow allocation mechanisms of the rated transaction. Besides the contractual priority of payments, the cash flow model incorporates key assumptions such as asset recovery rates and timing, cure rates, default timing and interest rates. We apply lower asset recovery rate assumptions for higher-rated tranches, i.e. rating-conditional haircuts.

We assess qualitative and quantitative inputs which are material for the analysis of the transaction and then decide on the rating by considering its sensitivity to key analytical assumptions. Quantitative results alone do not dictate the final rating assigned to an instrument because the rating outcome also reflects our qualitative and fundamental credit views of the key risks in an SME ABS transaction.

In this document, we present the six areas we analyse for a new securitisation, ordered in their natural sequence. Counterparty and legal analysis overarch all of the analytical steps and are central to the first four analytical blocks.

## 5. Originator and servicer analysis

In this phase of the analysis, we develop an understanding of the originator's strategy, products and processes, which includes an assessment of its portfolio servicing capabilities[4]. The information we receive, typically in the form of a presentation, provides the background to our interpretation of the originated assets' credit performance. This is necessary to identify and quantify the risks

[2] See General Structured Finance Rating Methodology Appendix III Technical note on of Scope's portfolio model (Scope PM).
[3] See General Structured Finance Rating Methodology Appendix II Technical note on Scope's cash flow model (Scope CFM) implementing the expected loss framework.
[4] In SME ABS transaction, the originator and portfolio servicer are often the same entity. If this is not the case, we assess the servicing capability of the entity in charge of the servicing.

that could affect the securitisation notes. We factor our findings into our base case analytical assumptions, which result from a quantitative analysis of performance data.

### 5.1 Fundamental areas of the analysis

We leverage on the originator's knowledge of its customers. An analysis of the originator's market positioning, product portfolio, origination strategy, risk management and asset monitoring, and recovery functions provides us with the qualitative framework to develop an informed credit view of the assets of each securitisation.

Figure 1 shows some of the themes covered in our originator analysis.

**Figure 1. Classic areas of originator and servicer analysis**

| Theme | Objective |
|---|---|
| **Market positioning and strategy** | Understand the stability of strategy over time: whether products and obligor segments have been time-tested, and the originator's general risk appetite |
| **Staff, systems and processes** | Develop a view of the originator's operational competence, capacity, and expertise in managing assets relevant to the transaction |
| **Underwriting standards** | Understand whether the originator adheres to best practice on the market with respect to internal controls, data, documentation and processes, and, principally, the risk function's degree of independence |
| **Origination performance** | Rank the credit performance of the originated assets compared to the credit performance of market peers |
| **Monitoring and recovery strategy** | Understand whether the monitoring and recovery processes are oriented towards preserving the relationship with the obligor (thus allowing for forbearance) or towards the early solution of problems affecting asset credit performance (pre-NPL management and recovery management) |
| **Risk models** | Understand the rating models used by the originator in order to incorporate the originator's information into our analysis, e.g. internal ratings, scores, probabilities of default, compensation for possible forbearance |

For our analysis, we clarify the information provided by the originator in order to understand the differentiating factors affecting credit performance. We consider operational reviews to be a very useful tool for researching the points relevant to the securitisation. The relevant analytical teams at Scope and other public sources provide the bulk of the high-level information on the originator required for our analysis.

### 5.2 Alignment of interests

During the originator analysis, we also review the economic incentives within the structure. It is important to know whether or not the originator has enough 'skin in the game' in order to develop a well-informed, forward-looking view of its expected performance and the quality of its underwriting. Similarly, the manager's and the servicer's incentives are also important. We analyse how and to what extent the interests of the originator, the manager, and the servicer are aligned with those of the investors in the transaction.

This analysis focuses on interest alignment elements beyond the regulatory required risk retention.

## 6. Contract-type analysis

Contract-type analysis focuses on understanding the characteristics of the credit contracts that have been or will be transferred to the transaction portfolio in the context of the originator's positioning strategy. This is because risks associated with the same product type can vary, depending on the originator's expertise. An originator's expertise allows it to operate with more complex or riskier products, and to manage their performance according to its appetite for risk. Conversely, even simple products could pose challenges for inexperienced originators, for example, they might not anticipate the possibility of sudden shifts in default trends or the need for specialised recovery agents in times of stress.

The product types and their features directly affect the characteristics of credit risk in the transaction portfolio. Credit losses could be very sensitive to the servicer's monitoring processes where recovery prospects after an obligor default are very slight. On the other hand, in the case of mortgage loans, credit losses could depend considerably on the assessment of the value of the collateral.

The analysis of product types also allows us to identify risks from obligor defaults besides credit losses. We analyse set-off risk if there are direct exposures, such as customer deposits, which can be set off against securitised credit rights. Losses from such set-

offs can also be material for product types like purpose-specific loans, for example, if these result from indirect exposures to linked insurance contracts.

Regarding the securitised products, we pay close attention to: i) the amortisation profile; ii) maturity and prepayment options; iii) interest-related characteristics (i.e. interest rate type, payment frequency); iv) the type and value of the security; v) the relation to specific obligor groups; vi) the relation to possible linked contracts; vii) the origination channel; and viii) any characteristic obligor behaviour with respect to a particular product type.

We develop a view on the long-term average performance of the transaction's most relevant product types, as well as of forward-looking performance over the same period as the transaction's WAL. For this purpose, we use information from the originator, as well as other public data such as macro series, e.g. delinquency, GDP or unemployment.

Appendix VI "Legal considerations in structured finance" in the General Structured Finance Rating Methodology provides further details regarding the contract-type analysis.

# 7. Portfolio performance analysis

## 7.1 Portfolio defaults analysis

The portfolio default analysis produces a probability distribution of portfolio defaults, which we use to analyse asset portfolio cash flows in the structure and to calculate each tranche's expected loss and expected WAL. Section 5.1.2 of the General Structured Finance Rating Methodology generally outlines the two approaches that we apply to establish this probability distribution, depending on the portfolio's granularity, which can be either **non-granular** or **highly granular**.

### 7.1.1 Default analysis using the highly granular approach

We apply the **highly granular** – parametric – approach and use an idealised portfolio-default distribution if the effective number of obligors is higher than 500 (see Appendix I) and there are no significant single asset, obligor or industry concentrations. With this approach, we typically assume an inverse Gaussian distribution[5] of defaults for granular portfolios with deal-specific modelling parameters. To derive the default-distribution inputs, we use historical data, ideally in the form of default vintage data from the originator.

The inverse Gaussian probability distribution is a good proxy of the probability distribution of defaults for granular portfolios. The inverse Gaussian distribution is also simple because it is fully characterised by its mean and coefficient of variation. The coefficient of variation is the standard deviation divided by the mean, i.e. it is a normalised standard deviation. The shape parameter of the inverse Gaussian distribution can be expressed as $\lambda = \mu / CoV^2$.

We choose the mean and the coefficient of variation of portfolio default rates which are specific to the transaction's portfolio of assets, taking all of the information available to us into consideration. The mean default rate reflects the expected performance of the portfolio of assets for the life of the transaction given the economic environment. For example, reflective of our forward-looking approach, we complement recent historical performance with other qualitative considerations if justified by macroeconomic growth prospects or the possibility of a recession.

We also adjust these assumptions to incorporate additional information provided by the originator, such as internal risk measures, as well as our forward-looking view, which considers aspects specific to the origination or product, as well as macro- and microeconomic conditions. The interpretation of default vintage data in the context of findings from our originator analysis and adjustments to address special risks in the portfolio is critical when using this approach. For example, certain product types might involve refinancing risk (in the case of credit lines), which would require adjustments to the mean default rate and the coefficient of variation.

In addition, we consider adjustments to the base case default rate if the product mix of the transaction's portfolio deviates from the originator's asset book that underlies the performance data.

[5] We also use other probability distributions in rare instances if we believe we need to account for higher tail risk, which requires a distribution with more probability mass in the distribution tails. This would be clearly communicated and justified in the rating publication.

If the portfolio includes assets with heterogeneous credit characteristics, we can split the portfolio into homogeneous segments with similar default or recovery characteristics in order to make our analysis more accurate. We apply the highly granular approach to portfolio segments if these are also granular, or if these are immaterial in the context of the total portfolio. We derive a mean default rate and a default rate coefficient of variation assumption for each segment. They are then combined by assuming that the portfolio segments are perfectly correlated.

Portfolio default rate assumptions take the effect of seasoning into account and thus do not represent the full lifetime of securitised products. Rather, these assumptions correspond to the marginal life-to-maturity that is left from the portfolio's seasoning point.

See Appendix II for details on how we perform a vintage analysis for rating securitisations of granular portfolios. Please refer to our 'Data adequacy' section for considerations regarding the quality of vintage data.

### 7.1.2 Default analysis using the non-granular approach

We prefer a **non-granular** analysis to derive the portfolio's default rate probability distribution if the portfolio is exposed to obligor or industry concentrations. The **non-granular** approach naturally addresses the portfolio's obligor and asset concentrations as well as its amortisation characteristics. Our obligor-specific default assumptions generally reflect a through-the-cycle view.

With the **non-granular** approach, we typically use asset-specific modelling assumptions to create the portfolio default distribution. We simulate loan-level defaults using our portfolio model, a multi-factor, single-step Monte Carlo default-simulation engine within a Gaussian copula correlation framework. This non-parametric approach generally uses obligor-specific data, depending on the information available. The General Structured Finance Rating Methodology Appendix III provides further details regarding our portfolio model Scope PM.

#### 7.1.2.1 Obligor-specific assumptions for the non-granular approach

The **non-granular** approach allows us to capture obligor-specific default assumptions when available. Using this approach, we derive our portfolio modelling assumptions by leveraging on probabilities of default or internal ratings/scores assigned by the originator. We complement this information with the default frequencies observed by the originator when back-testing its internal rating systems, as well as with static, i.e. vintage, or dynamic delinquency data representing the assets in the portfolio.

We also assess the credit risk of large individual exposures above a certain threshold. This is because the largest exposures in an SME ABS portfolio, i.e. top obligors, pose significant idiosyncratic risks that would not be averaged out in our overall portfolio analysis. Large exposures also present the risk that actual recovery rates can deviate from statistically derived assumptions, particularly for obligors with low credit quality. This could be the result of idiosyncratic factors affecting the obligor or, in the case of mortgages, the security's conditions and characteristics.

Our method to analyse large obligors is detailed in section 5.1.4 of the General Structured Finance Rating Methodology. This section outlines the concentration thresholds considered when we decide on which approach we use to assess the risk of large obligors in SME ABS transactions. Additionally, Figure 2 highlights the adjustments which we consider when stressing the risk of large obligors in non-granular SME ABS transactions.

**Figure 2. Top obligor stress applicable to the non-granular approach**

| Element | Value |
|---|---|
| **Top obligor concentration range** | Top five obligors and each loan above 5% of portfolio balance |
| **Correlation add-on among top obligors** | 20 pp |
| **Haircut to rating-conditional recovery rates** | 10% |

The adjustment for obligor concentration addresses the risk that top obligors default with a higher correlation. We incorporate in our analysis any fundamental information from the originator regarding top obligors, from their internal rating and monitoring status to financial information.

We also apply the top obligor stresses to the five largest exposures in a portfolio, irrespective of whether or not each is above the 5% threshold.

Obligor concentration adjustments have a negligible effect on portfolios with low obligor concentrations; the impact becomes notable as obligor concentration increases and as the quality of large obligors deteriorates. We address mild obligor concentration in accordance with the highly granular approach. In such instances, we address the risk of a higher correlation from obligor concentration by stressing the coefficient of variation used to build the inverse Gaussian distribution of portfolio defaults.

#### 7.1.2.2 Analysis of originator's internal rating models/systems

Our analysis can incorporate obligor-specific probabilities of default. We analyse the originator's internal rating systems and extract information about the obligor's relative credit quality and probability of default. This process often involves a mapping of the originator's internal rating categories or an adjustment of its internally assigned probabilities of default.

First, we analyse the originator's rating/scoring systems so as to understand their output. We then decide on adjustments needed to transform the originator's probabilities of default so that they represent our view of the specific asset portfolio. We use either the result of the vintage analysis or observed default frequencies to back-test the data from the originator's rating models. Our analysis requires a review of the rating models' discriminatory power, which we expect to be satisfactory for banks operating under the advanced IRB approach. Back-testing data showing the observed default frequencies and rating migration for the originator's different rating categories provides the best information for understanding the internal rating scale. The discriminatory power of the model also allows us to decide on the reliability of the originator's extreme rating categories for which the statistical significance may be weaker, i.e. very high and very low rating categories.

Rating systems can have very different objectives which determine the level and meaning of default probabilities. This is irrespective of the high degree of convergence among European banks' rating systems, resulting from common regulatory frameworks. For example, some originators use 'management' probabilities of default to adjust underwriting or pricing to the bank's current risk appetite; whereas other originators aim to produce through-the-cycle indicators of the obligor's propensity to default.

#### 7.1.2.3 Correlation framework

We assume asset-value, pair-wise correlation levels, typically ranging from 5% to 30% for non-granular portfolios. We deviate from this range in order to capture correlation specificities of asset portfolios. The framework includes several correlation factors, including global; country and/or regional; industry; and obligor-idiosyncratic factors. Group dependencies increase portfolio correlation because they synchronise the defaults of obligors for which a corporate group or economic relationship exists. We also apply a stress to the pair-wise correlation of the largest obligors as in Figure 2.

The asset correlation observed for SMEs in Europe is lower than the correlation for larger corporates[6].

### 7.1.3 Other considerations regarding default analysis

#### 7.1.3.1 Transaction default definition and cure rates

We perform a default rate analysis based on the transaction's default definition, generally ranging from 90 to 360 days past due. If available, we also analyse roll rates from early arrears to default, which provide an early warning of deteriorating performance.

If the default definition in a transaction does not match that of the vintage data provided for the analysis, we may quantify cure rates. Cure rates indicate the recovery from obligors that become performing again and have not rolled into a default according to the transaction documents. Cured delinquency positions repay all due and payable interest and principal, becoming current.

Our analysis incorporates the impact of cure rates on a portfolio's cash flows. The cure rate assumptions are kept constant for all rating categories. Like defaults, delinquencies impact a transaction's liquidity, as overdue instalments move through the delinquency buckets to ultimately default – or cure.

#### 7.1.3.2 Default timing

We take the assets' amortisation characteristics into account in our default timing assumptions. We derive default timing from either: i) vintage analysis; ii) the amortisation profile from the portfolio that is compounded with a constant, unconditional default frequency; or iii) the portfolio simulation.

[6] The 'EBA Report on SMEs and SME Supporting Factor' provides a comprehensive list of references to research papers on the topic of SME correlation. The EBA report is available on the EBA website.

Default timing assumptions cannot be decoupled from the balance of an exposure at risk of default. We do not arbitrarily allocate defaults in the life of the portfolio as this would result in unrealistic default intensities for some periods.

If appropriate, for example if the portfolio contains a significant amount of bullet exposures with concentrations around a given maturity date, we may also apply more front or back-loaded default timings.

#### 7.1.3.3 Point-in-time and long-term default distribution

The historical default and performance data of the assets provided by the originator should cover a sufficiently long time period spanning an economic cycle for us to use it as the basis for deriving the key assumptions of a single portfolio-default distribution as described above.

In cases where the period covered by originator data is too limited, we either: i) apply different qualitative techniques to adjust the assumptions from which the portfolio default distribution is created; or ii) use two different portfolio default rate distributions incorporating a point-in-time and a long-term credit view, as described below.

The latter option is typically only used in specific cases if the following cumulative factors apply: i) the historical data shows a strong link with the economic cycle e.g. due to stable origination practices in good and bad times7; ii) there have been clear up- and downturns in the economic cycle in recent history; iii) market-wide credit-related data is available, which covers a long-term period without suffering from breaks, changes in definitions or other data inconsistences which impair historic comparability, preferably in vintage format; and iv) the originator's underwriting practices largely conform with market standards, i.e. default levels for the originator are closely linked to market-wide levels. In such cases, we may use two different portfolio-default distributions: i) a point-in-time distribution; and ii) a long-term distribution, reflective of a full credit cycle.

We apply point-in-time and long-term asset-specific modelling assumptions to create the point-in-time and the long-term portfolio default distributions, respectively, using the non-granular approach. In contrast, when using the highly granular approach, we consider the point-in-time and long-term distributions using an inverse Gaussian probability function with different modelling parameters, i.e. different means and different coefficients of variation.

- The **point-in-time distribution** typically reflects expected portfolio defaults based on limited historical data, generally vintage data provided by the originator not covering a full economic cycle.
- The **long-term distribution** reflects portfolio defaults which we expect in a long-term average credit environment, representing our through-the-cycle view. We analyse long-term data series to derive a portfolio's long-term default assumptions. Long-term data series are extrapolated with the support of macroeconomic factors, which closely correlate with the obligors' credit performance. For example, GDP and wage growth or unemployment rates can be used to infer SME default rates over a full economic cycle. The long-term distribution of defaults may differ from recent historical performance. For example, the long-term mean default rate assumption could be higher than any default rate observed in the originator's data if this data does not cover a period of significant stress.

In case applicable, we use the long-term distribution of portfolio defaults to calculate the expected loss, using an average through-the-cycle performance reference for a $AAA_{SF}$ stress and a point-in-time distribution of portfolio defaults for a $B_{SF}$ stress. Under all other rating stress scenarios, i.e. from $BB_{SF}$ to $AA_{SF}$, we blend the results obtained from both point-in-time and long-term defaults. As the rating target becomes higher, this blending process assigns more weight to the long-term distribution and less to the point-in-time. This approach can prevent undue volatility for high investment grade ratings over the economic cycle. The stabilisation effect on non-investment grade ratings gradually becomes less noticeable, and $B_{SF}$ ratings are driven only by the point in-time distribution.

Point-in-time and long-term default distributions may converge, depending on the length of the data history provided by the originator. We also expect the two curves to broadly converge for jurisdictions in which economic performance has been relatively stable over a long time, such as in Germany. In cases where the long-term default distribution rate is less conservative than the point-in-time rate, we only give partial credit to long-term performance if credit-trend fundamentals are changing and the long-term

[7] Originators often apply stricter underwriting criteria in down cycles and laxer ones in good times. Therefore the link between the economic cycle and default rates can be very muted and in some cases even negative, i.e. lower default rates during harsher economic periods or vice versa.

mean should be questioned. For example, a past cycle may become irrelevant if lending standards, product types and legal regimes change significantly or if other fundamental factors, such as the labour market, change structurally.

## 7.2 Recovery analysis

We calculate portfolio recovery rates using two different approaches, which can effectively coexist: i) statistical analysis; or ii) fundamental analysis. The statistical analysis can apply to both secured and unsecured exposures while the fundamental analysis can only be used for secured exposures. We assume fixed recovery rates upon an asset's default and apply a recovery rate stress which increases as a function of the instrument's targeted rating (rating-conditional stress).

### 7.2.1 Statistical recovery analysis

We use vintage analysis to derive our recovery assumptions if the recovery vintage data broadly reflects the portfolio's characteristics. This recovery analysis approach is statistical in nature. We also create an idealised recovery term structure by considering the overall level and timing of the recovery.

For example, banks often use different mechanisms to reduce the severity of a default. Some of these mechanisms do not allow a fundamental analysis of a particular security type. However, the effect of these mechanisms is captured well by the recovery vintage data. Data obtained from banks have shown that certain guarantees made by a business owner or a close relative can effectively lower the rate and severity of a default.

### 7.2.2 Fundamental recovery analysis

We can calculate the recovery rates for secured assets by analysing the value of the dedicated security. The security value is the stressed value of the underlying collateral or the stressed present value of cash flows that the collateral generates. This analysis considers the distance to a long-run or sustainable price level for the underlying collateral, as well as haircuts resulting from market volatility, fire sales and liquidation costs during a foreclosure process. Market-value decline assumptions are specific to the collateral, its geographic location, and market conditions.

The framework for our fundamental recovery analysis involves: i) estimating the current value of the collateral, typically by indexation[8]; ii) estimating the collateral-type-specific value distance to sustainable values; and iii) haircutting the current value of the security by applying a market value decline and a fire-sale discount.

The recovery rates considered for secured exposures, typically mortgages, under the portfolio-model approach reflect the reduction of the outstanding notional amount of the asset from amortisation. Deleveraging reduces the loan-to-value ratio and increases the recovery rate of back-loaded defaults.[9]

Our General Structured Finance Rating Methodology explains the fundamental recovery framework which we use to estimate the proceeds recovered from enforcing a security. The framework includes the adjustment of the security value to a long-term sustainable value in order to estimate the recovery proceeds under the highest rating stress. $AAA_{SF}$ market value declines capture the distance to sustainable values and an additional rating-conditional stress that depends on the volatility of the respective market. Whereas $B_{SF}$ market value declines generally reflect our forward-looking view, they still include the effect of a fire-sale discount.

We only use a fundamental recovery analysis if the security represents a first-lien claim or if any prior charge is known and fixed. We do only give limited credit to shared collateral in our fundamental analysis, because it presents conflicts of interest that could result in the adverse enforcement of the security.

A prerequisite of this type of analysis is that the security cannot be challenged legally. We expect to see clear legal opinions regarding any security available to the assets, for example, an opinion with respect to any mortgage guarantees.

### 7.2.3 Rating-conditional recovery haircuts and limits

We begin our recovery analysis by deriving a recovery rate assumption. As described above, this is done by analysing historical data, ideally vintage data, and/or for certain secured exposures a fundamental approach may be used.

[8] Indexation refers to updating the value of a given security using an index that is highly correlated with the security value. For example, house price indices can be used to update the value of properties that back a mortgage loan.
[9] This effect is captured through vintage analysis in the highly granular approach.

We analyse the expected loss of a rated tranche by applying a recovery rate assumption specific to the transaction and rating level. Recovery rate assumptions are tiered to represent ever-growing stresses as the rating becomes higher. For example, an instrument's expected loss when testing a $AAA_{SF}$ rating is derived by applying the highest recovery stress.

We also apply portfolio-level limits to recovery rates which depend on the type of security available to the underlying credit rights in the portfolio. For example, we constrain the recovery rate of a portfolio of mortgages to a maximum of 90% for a target of $AAA_{SF}$.

Figure 3 shows the indicative rating-conditional recovery rate stresses which we apply when analysing SME ABS transactions. Haircuts apply to the recovery rates derived from vintage analysis. Limits apply to portfolio-level, weighted-average and secured recovery rates calculated from the value of the underlying mortgaged assets. Haircuts can increase beyond the indication in Figure 3 if we identify significant volatility in the historical recovery performance data.

**Figure 3. Scope's indicative recovery rate haircuts and limits**

| Rating level stress | B | BB | BBB | A | AA | AAA |
|---|---|---|---|---|---|---|
| **Haircut to expected recovery** | 0% | 8% | 16% | 24% | 32% | 40% |

#### 7.2.4 Recovery timing

We derive recovery-timing assumptions from the term structure of recoveries observed. The actual recovery pattern depends on the type of asset and the point in the economic cycle.

### 7.3 Prepayment analysis

We consider high and low prepayment scenarios. High prepayment stresses typically cover historical highs. Low prepayment stress is typically a 0% conditional prepayment rate assumption. We apply a different prepayment framework if this is justified by specific asset, and/or macroeconomic concerns, i.e. the risk that interest rates change in the context of a significant fixed-rate exposure.

## 8. Structure and cash flow analysis

We apply the default rate distribution derived from our portfolio default analysis in order to examine cash flows in the structure. The analysis determines the cash flows available to an investor in a tranche of the structure when considering a given default rate for the portfolio of assets. The cash flows to the tranche allow us to calculate a specific tranche's loss and its WAL according to the portfolio default rate being considered.

A tranche's expected loss and expected WAL are the probability-weighted averages of a tranche's losses and WALs obtained for all possible portfolio default rates.[10]

We take the main features of the structure into account so as to correctly capture the loss contributed by all portfolio default rate scenarios. We simplify the structure if certain mechanisms become irrelevant for the rating of certain liabilities. For example, subordinated items in a priority of payments are irrelevant if the junior tranche is not rated. Specific structural features benefit some investors but harm others, i.e. depending on tranche subordination, and our analysis aims to capture these differences.

### 8.1 Notable structural features

#### 8.1.1 Replenishing portfolios

SME ABS structures often feature replenishing or revolving portfolios. These structures introduce additional uncertainty and typically result in life extension and an increased risk exposure compared to the static-portfolio equivalent. We analyse transactions with replenishing portfolios, accounting for the risk that the portfolio can deteriorate and its characteristics change, all within reasonable (feasible) limits. The risk of deviations beyond these limits is covered by the standard stresses applied during our analysis.

Revolving portfolios pose the risk of changes to the portfolio's characteristics, also known as portfolio migration. Portfolio migration – due to changes in market conditions, obligor demand, or origination and underwriting strategy – is typically limited by asset and

[10] Please refer to our General Structured Finance Methodology Appendix II: "Technical note on the expected loss framework".

portfolio covenants. We analyse SME ABS portfolios by considering the potential of portfolio migration in the context of the originator's history and strategy, the characteristics of the asset type, as well as asset and portfolio covenants in the structure.

Structures typically feature early amortisation triggers to limit deterioration during the revolving phase. We assume a reasonable level of deterioration in the portfolio's performance within the limits set by early-amortisation triggers. We thus analyse the amortisation phase under the portfolio assumptions resulting from the considered deterioration.

We analyse the amortisation phase of this least-favourable portfolio and benchmark the expected loss on the rated instrument with its expected WAL over the amortisation phase only.

#### 8.1.2 Pro-rata amortisation

The pro-rata amortisation of a securitisation structure's liabilities releases credit enhancement that is otherwise available to more senior tranches. The release of credit enhancement could leave a senior class exposed to tail concentration risk. We analyse the cash flow mechanics of the structures in order to accurately assess losses resulting from the scenarios allowed by the conditions governing pro-rata amortisation, particularly those that test the minimum level of credit enhancement necessary for pro-rata amortisation, and those that stop pro-rata amortisation to prevent excessive tail risk for senior tranches.

#### 8.1.3 Class A pro-rata amortisation

Arrangers may use different amortisation speeds for senior tranches depending on whether certain conditions are met. This has the effect of extending the life of a senior tranche, for instance by making it become pari-passu under stress.

Our expected loss framework captures the different risks for senior tranches with different repayment speeds. We do not deem instruments with different expected WALs to be equally risky. Our implementation of the expected loss framework allows us to capture the different risk for senior tranches which are only pari-passu under stress scenarios.

The impact of tranche thickness on the calculation of expected loss is a further reason why conditional pari-passu tranches can have different ratings. This is because senior tranches are seldom split into equally large tranches. Consequently, the loss for the thinnest tranche could be more severe than for the thicker tranche; and the thinnest tranche could thus be assigned a worse rating, even if expected WALs intuitively suggest a different result. This implication is important for investors and makes our ratings more informative.

#### 8.1.4 Early termination options

We do not take options to terminate a transaction prematurely into account. This is because call options are typically discretionary and require the originator to repurchase the outstanding portfolio of assets. Generally, the early termination of a transaction would only be possible if all liabilities are repaid in full. However, certain jurisdictions allow junior instruments to become exposed to market value risk upon such a termination.

#### 8.1.5 General-purpose reserve facilities and timely payment of interest

SME ABS structures sometimes feature generic cash reserves which not only support liquidity but can also be used to accelerate the amortisation of the notes. This creates a risk that the cash reserve may be depleted, thus leaving the structure without liquidity support. However, this risk is generally remote, as these structures also feature a combined priority of payments which allows principal collections to be used to pay interest on senior tranches.

Section 5.3.3 of the General Structured Finance Rating Methodology provides further detail on our assessment of liquidity risk and rating-conditional liquidity support.

### 8.2 Risk factors relevant to cash flow analysis

#### 8.2.1 Interest risk and foreign-exchange risk

We analyse any unhedged exposure related to interest rates if there is the risk of a material impact. We consider the effective coverage provided by the structure's natural hedges and/or characteristics when assessing the materiality of an exposure. For example, we acknowledge the high correlation between certain indices which ultimately refer to Euribor indices in the eurozone.

We quantify other risks related to interest rates and the interest-related cash flow from assets if these represent a sizeable source of loss for a rated tranche. Examples include interest rate reset risk, interest payment frequency risk and interest payment date risk.

#### 8.2.2 Fees

We account for transaction fees and incorporate reasonable stresses in order to cover for eventual counterparty replacements. The amount of stress depends on the standardisation of the securitised collateral, the complexity of the tasks performed by the counterparty and the availability of competitive alternative providers.

## 9. Legal analysis

Our credit analysis approach depends on our assessment of a series of legal risks. Consequently, we review independent, expert legal opinions in order to validate assumptions regarding relevant legal issues that may affect a transaction. We begin our analysis with legal and counterparty risks if securitisation regimes do not support conventional assumptions.

For further details, please consult Scope's General Structured Finance Rating Methodology, available at www.scoperatings.com.

## 10. Counterparty risk

Our approach to assessing counterparty risk in SME ABS transactions follows our Methodology for Counterparty Risk in Structured Finance, available at www.scoperatings.com.[11]

Generally, we expect resolvable financial institutions to continue operating as a going concern following financial impairment and to honour their operational contractual obligations for at least the duration of the resolution process. This view provides reasonable comfort that structural features to protect the structure against counterparty risk could be implemented before this risk effectively crystallises. Likewise, this view limits our concerns with respect to servicing disruptions if the servicer of the securitised assets is a regulated and resolvable bank.

The honouring of contractual obligations through a resolution process also has significant implications for leasing transactions if the originator pledges to the securitisation fund the value of the asset underlying the leasing contract as a form of security. We believe that, for a resolvable bank, the recovery rate assumptions regarding securitised leasing contracts could benefit from such a security, even for rating scenarios beyond the bank's issuer rating.

## 11. Sovereign risk

We do not mechanistically limit the maximum rating achievable by an instrument as a function of the sovereign credit quality of the country in which the assets are located or the issuer's domicile. We believe the likelihood that non-diversifiable sovereign risks will materialise is remote for most eurozone countries. Examples of such risks are: i) uncertainty about the enforceability of contracts; ii) expropriation or nationalisation of local assets; iii) military conflict; or iv) a capital transfers blockage with or without conversion to local currency and devaluation. These risks are even more remote for instruments that benefit from quick amortisation.

We believe that the credit quality of a sovereign is an inadequate anchor for a rating cap on structured finance ratings, particularly in eurozone countries. For example, the conditions – legal security and institutional framework – under which a securitisation would operate in developed economies would not be affected, even if fiscal consolidation targets are imposed on a sovereign by foreign counterparts or peers.

We incorporate macroeconomic factors into our analysis by identifying risks that may hurt the credit performance of the portfolio of SME assets. These macroeconomic factors also affect sovereign finances and can create very stressful conditions for SMEs. For example, fiscal consolidation measures implemented by the government could increase the tax burden for SMEs.

## 12. Rating stability and break-even analysis

Our quantitative analysis framework for structured finance transactions is designed to result in rating stability for instruments achieving the highest rating categories, generally applicable at the top of the capital structure. Two mechanisms allow for this: i) rating-conditional recovery rate stresses; and ii) the definition of senior protection buffers based on a distribution which reflects the portfolio defaults we expect in a long-term average credit environment (through-the-cycle view).

[11] In the case of deviations between this document and the latest update of our Methodology for Counterparty Risk in Structured Finance, the latter prevails.

Our rating communication provides information on the sensitivity of our quantitative findings when shocks are applied to relevant analytical assumptions. Sensitivity test scenarios have the sole purpose of illustrating the sensitivity of the ratings to input assumptions and are not indicative of expected or likely scenarios.

Figure 4 provides the scenarios we report. If we find that an instrument's sensitivity to a certain assumption is too high, we may decide to lower the final rating in order to increase the rating's stability. This assessment of an appropriate level of sensitivity accounts for the conservatism we apply when calibrating the base case assumptions.

**Figure 4. Typical sensitivity tests considered during analysis**

| Analytical assumption tested | Shifts considered |
|---|---|
| **Mean default rates (i.e. expected mean DR and long-term mean DR)** | +50% |
| **Recovery rate** | -50% |

We also provide the transaction portfolio default rates below which no loss is seen for a given tranche (break-even default rates) – under the rating-conditional recovery assumption as well as under zero recovery. This information provides investors with an additional perspective on the resilience of the rated instruments.

## 13. Data adequacy

We are flexible with respect to the information we utilise to produce a rating. We use information that is already available in the originator's systems and do not impose a particular template or data format for processing. Risk information systems and the disclosures of large and medium-sized banks have improved both in volume and quality, particularly with respect to monitoring and recovery functions, i.e. before and after obligor default.

Our unique bottom-up approach requires information that allows us to develop a differentiated credit view on the originator, the assets and the portfolio. We assess the adequacy of the information received in terms of this objective. We will explain the limitations of available data and only ask for more detail when the information available proves insufficient for the rating of a transaction.

### 13.1 Vintage sample

We use vintage data that describes the assets which will be securitised in a transaction. Information specific to certain portfolio segments is relevant if the weights of the segments in the portfolio differ to those in the originator's entire book. This is also the case if the weights of the segments have changed materially over time. For example, we would need segment-specific data to capture performance differences if a portfolio is exposed to mortgage and non-mortgage loans and the weights of these segments have not remained constant over time.

We also check that the granularity of performance references is sufficient to derive statistically significant base cases. For example, we may not be able to give credit to recovery performance over a period in which few foreclosures were observed, as is generally the case for benign periods.

### 13.2 No portfolio data template

We do not use a proprietary portfolio template for SME portfolios. Instead, we welcome adherence by originators to the portfolio reporting standards set by the ECB taxonomy and adopted by the European DataWarehouse. We are also able to work with any portfolio template that allows us to analyse the credit characteristics of the portfolio of assets for an SME securitisation and compare them to the characteristics of the originator's entire book and to the characteristics of the overall economy of the originating country.

### 13.3 Data checks

We check the information received from originators and other sources for consistency. We may need additional information or clarifications if the information appears inconsistent to us. However, these checks do not verify the reliability and accuracy of the information and data we use during our rating analysis.

For the portfolio, reports on procedures agreed upon with independent auditors effectively limit operational risk around asset transfers and portfolio characteristics if the originator is new to securitisation.

We believe that the reliability of the information supplied increases with the degree of the originator's alignment of interests with noteholders, or the independence, experience and financial strength of the parties providing information. For example, independent legal opinions give us reasonable comfort that our analytical assumptions are not compromised by legal questions; whereas representations by an affected party would not be deemed as robust.

We use conference calls and operational review visits to obtain more detail on the data and information we receive. When necessary, we review files in order to form a clearer picture of the processes presented during the operational review visit, or to better comprehend the assets being securitised. Nevertheless, we do not generally undertake any type of file review to identify errors in the portfolio data tape we have received for analysis.

## 14. Monitoring

We monitor SME ABS transactions using performance reports produced by the transaction manager and any other information received from the originator. The ratings are monitored continuously and reviewed at least once a year or earlier if warranted by events. The monitoring process involves frequent high-level checks and, typically, annual full-rating reviews.

Our monitoring check is a frequent, high-level assessment of a transaction based on regular reports received from trustees, management companies, servicers or originators. A monitoring check does not involve a rating action, but may trigger a monitoring review or even a full rating review.

The monitoring review is a rating review triggered by either a relevant event or the end of the annual rating review period. Monitoring reviews pay special attention to comparing the transaction's actual performance with our expectations.

## Appendix I Analysis of portfolio concentrations

We analyse a portfolio's granularity before choosing which approach to use to determine the portfolio default distribution. The granularity metric which we use is the diversity index with an order of diversity of two. This diversity metric is the inverse of the Herfindahl index and is applied to obligors, industries and regions. Thus, the diversity index represents the effective number of obligors, industries or regions in the portfolio, respectively.

For example, expression (1) shows the diversity index that measures obligor concentration.

(1) $${}^{2}D_{Obligors} = \frac{1}{\sum_{i=1}^{Obligors} {p_i}^2}; \; where \; p_i = \frac{Balance_{obligor\,i}}{Total\ balance}$$

We may apply the highly granular approach and rely on an idealised portfolio-default distribution if the effective number of obligors is higher than 500, see Figure 5. Otherwise, we may consider a portfolio simulation approach applicable to non-granular portfolios.

We address very low obligor diversity levels by complementing our statistical analysis with a fundamental credit analysis of large obligors. This analysis is performed in cooperation with our corporate ratings team. We also apply higher correlation assumptions to portfolios if the effective number of industries is less than three. In extremely rare circumstances, we may limit the maximum rating achievable by securitisations if the effective number of obligors, industries or regions indicates very high concentrations, i.e. diversity indices below the thresholds defined in Figure 5.

**Figure 5. Diversity thresholds for granularity assumption**

| Concentration factor | Typical effective number (highly granular threshold) | Diversity threshold |
|---|---|---|
| **Obligor** | 500 | 100 |
| **Industry** | 9 | 3 |
| **Region** | 4 | * |

* We assess regional concentrations qualitatively taking population and macroeconomic factors into account, rather than diversification across subjective administrative divisions of a territory.

## Appendix II Technical note on default rate vintage analysis

This appendix provides technical information on our vintage analysis. Some analytical steps may deviate from conventional vintage analysis and, in some instances, have a material impact on results. This note does not describe vintage analysis in full because it is a standard tool for the securitisation industry.

This note focuses on the vintage analysis of default rates, i.e. the defaulted notional as opposed to default frequencies (default frequencies being the number of defaults which would be employed when a portfolio-model approach is used).

### Intra- and inter-segment correlation

We consider portfolio segments found in granular SME portfolios to be perfectly correlated. In other words, no diversification benefit is granted to the segmentation of the portfolio by obligor, contract or security types. This 'perfect correlation' assumption for portfolio segments simplifies the calculation of the portfolio's coefficient of variation. This calculation uses the coefficients of variation of the different portfolio segments.

Our perfect correlation assumption is supported by the granularity of the SME portfolios covered in this methodology. We assume that the underlying obligors are or may be represented in all underlying segments of the portfolio and that their correlation is captured at the (granular) vintage data level. This is a reasonable assumption to make because all of the obligors in the portfolio are SMEs, which can therefore be expected to share the same correlation framework.

Consequently, we derive information about the correlation of the assets from intra-segment default volatility. The vintage data for each segment of the portfolio reflects the assets' correlation to the extent that the period covered by vintage data contains sufficiently diverse scenarios.

We assess whether the vintage data supplied by the originator provides adequate information about asset correlation. For example, the data will ideally reflect periods of stress showing a significant deterioration in asset performance starting from a benign period, i.e. from pre-recession to post-recession.

### Consolidation and extrapolation according to implicit credit quality

We consolidate vintage series into an annual series before calculating the coefficient of variation of the default rates for a given portfolio segment. We then extrapolate incomplete annual vintage series, accounting either for the average growth rate implied in more seasoned vintages, or for the growth rate implied by the credit quality that the incomplete vintage series has displayed to date. The latter allows a reasonable extrapolation, also when the more seasoned vintages do not show flat stabilisation for the term structure implicit in the credit quality of such a series. This approach standardises the analysis across transactions.

### Adjustments for seasoning (rebasing)

Vintage data shows the performance of representative assets from origination to maturity and reveals the average effect of seasoning. We adjust preliminary vintage analysis results to capture the effect of seasoning on the assets which have been or will be transferred to the portfolio. This adjustment (rebasing) produces the marginal cumulative default rate that applies to the portfolio of assets transferred to the special purpose vehicle, as opposed to the lifetime default rate of the assets since contract origination.

We rebase vintage results by taking the marginal contribution to the assets' lifetime default rate and applying it to the surviving balance of the vintage at the seasoning point calculated for a given portfolio segment. The seasoning point is the weighted average seasoning of the relevant portfolio segment. The balance at the seasoning point depends on amortisations and defaults since the contract's origination up to the time of the seasoning point.

We believe that the shape of default vintage curves is not determined by the credit quality of the underlying obligors improving, but rather by the factors involved in its composition. Typical curves reflect: i) the compounding of survival rates; ii) the amortisation of the initial balance; iii) the expiration of contracts at maturity; and – although this is not applicable to SMEs – iv) the possible higher propensity of obligors to pay as equity builds up in a loan.

The rebasing is described by the following expression:

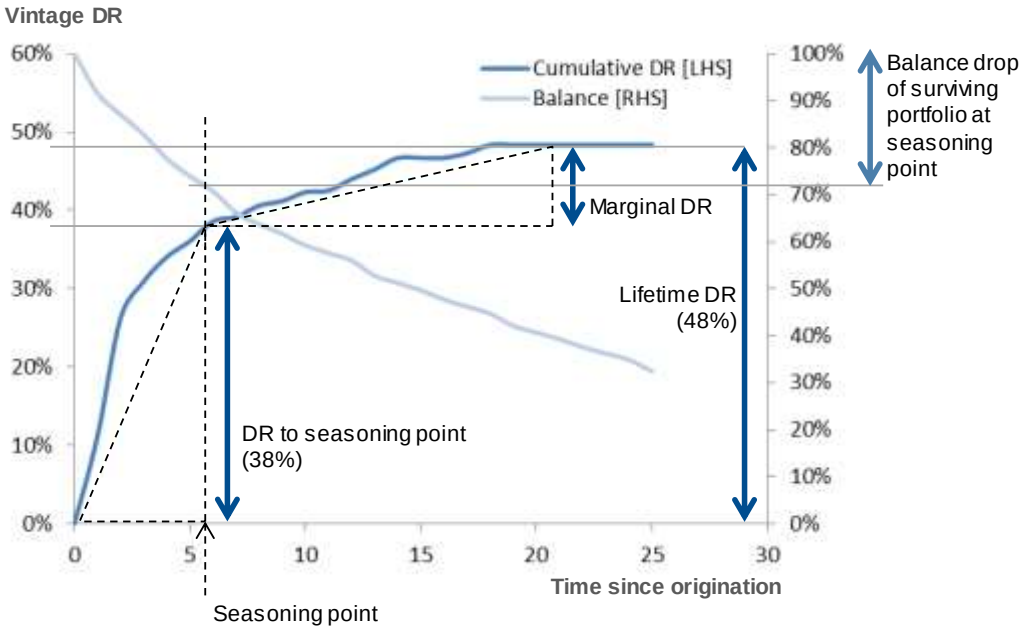
$$(1)\ \text{Rebased marginal DR} = \frac{\text{Marginal DR from seasoning point}}{1 - \text{DR to seasoning point} - \text{Drop in performing balance}}$$

Rebasing is illustrated in Figure 6 with an example. The marginal default rate of 10%, as applicable to the original balance at origination, is effectively 29.4% when applied to the balance of surviving assets at the seasoning point, see calculation (2). This marginal default rate is the lifetime default rate applicable to the securitised portfolio and differs from the original lifetime default rate of 48% at the time of the assets' origination.

(2) $\text{Rebased marginal DR} = \frac{(48\% - 38\%)}{1 - 38\% - 28\%} = 29.4\%$

The rebased marginal default rate can thus represent a percentage of the outstanding balance at the seasoning point which is larger than the original lifetime default rate as applicable to the original balance at origination.

**Figure 6. Rebasing of marginal default rate from vintage analysis**



## Appendix III Activity sectors

Our industry mapping consists of 26 separate sectors of activity. It is broadly based on the NACE 2009 industry classification, rearranged in terms of the type of economic sector: primary, secondary and tertiary. Figure 7 provides a list of activity sectors.

The activities in real estate are segmented into development and non-development. This is because the business model of development activities is what makes the sector vulnerable to cyclical boom and busts, following patterns of credit expansion and contractions in the economy. The long development cycle for real estate assets makes it very difficult for companies to adjust investment plans when the economic cycle changes. This is because development projects rarely take less than two years, even if starting from urban land. Conversely, non-development real estate activities are generally stable because real estate assets amortise over very long periods of time.

**Figure 7. Activity sectors considered when we assess industry concentrations in SME ABS transactions**

| Activity sectors | | |
|---|---|---|
| Agriculture & farming | Food, beverage & tobacco | Software & hardware |
| Chemicals, plastic & rubber | Industrial manufacturing | Telecommunications & networking |
| Energy | Pharmaceuticals & biotechnology | Utilities |
| Mining & metals | Transportation & logistics | Wholesale & retail trade |
| Packaging & containers | Accommodation, leisure & entertainment | Consumer services |
| Wood & paper products | Banking & finance | Government & public sector |
| Aerospace & defence | Healthcare equipment & services | Professional services |
| Automotive | Media | |
| Construction & materials | Real estate: development | |
| Consumer durables | Real estate: non-development | |

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