

Methodology

*Master European Residential Mortgage-
Backed Securities Rating Methodology*

AUGUST 2010



Insight beyond the rating.

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Related Research:

Legal Criteria for European Structured Finance Transactions and Addenda dated August 2010

Unified Interest Rate Model dated August 2010

Master European Structured Finance Surveillance Methodology dated August 2010

DBRS is a full-service credit rating agency established in 1976. Privately owned and operated without affiliation to any financial institution, DBRS is respected for its independent, third-party evaluations of corporate and government issues, spanning North America, Europe and Asia. DBRS's extensive coverage of securitisations and structured finance transactions solidifies our standing as a leading provider of comprehensive, in-depth credit analysis.

All DBRS ratings and research are available in hard-copy format and electronically on Bloomberg and at DBRS.com, our lead delivery tool for organised, Web-based, up-to-the-minute information. We remain committed to continuously refining our expertise in the analysis of credit quality and are dedicated to maintaining objective and credible opinions within the global financial marketplace.

This methodology replaces and supersedes all related prior methodologies. This methodology may be replaced or amended from time to time and, therefore, DBRS recommends that readers consult www.dbrs.com for the latest version of its methodologies.



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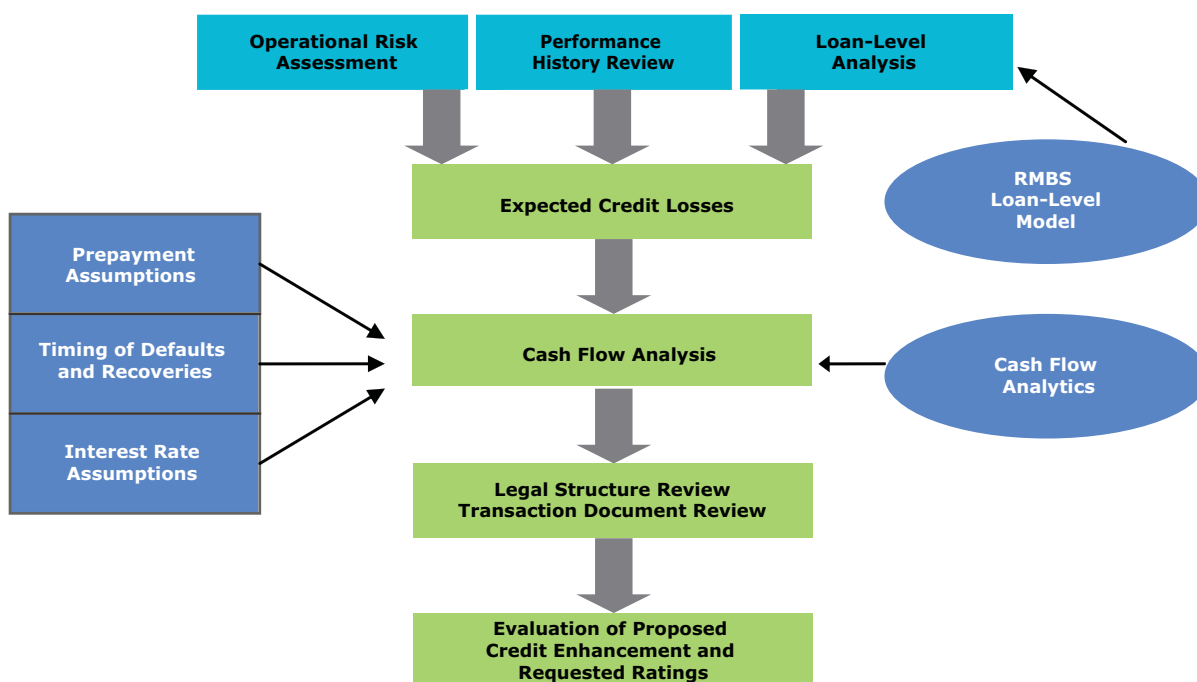
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Executive Summary

DBRS Ratings Limited (DBRS) is requesting comments on the proposed rating methodology for European residential mortgage-backed securities. Comments should be received on or before October 29, 2010. Please submit your comments to the following e-mail address: dbrseurmbcomments@dbrs.com. DBRS will publish a final methodology following the review and evaluation of all submissions.

This report describes the DBRS rating methodology for European residential mortgage portfolios and forms part of the DBRS criteria for rating European residential mortgage-backed securities (RMBS) and other transactions linked to residential mortgage assets including covered bonds. Please also refer to the appropriate jurisdictional RMBS methodology for additional detail regarding DBRS asset analysis.

DBRS Rating Process for European RMBS Transactions



The diagram above describes the process for analysing a mortgage transaction:

- (1) DBRS assesses the operational risk by evaluating the quality of the mortgage originator and servicer.
- (2) DBRS reviews actual performance data of the originator and servicer with respect to historical defaults and recoveries.
- (3) DBRS conducts a loan-level analysis using its proprietary European RMBS Credit model (RMBS Model), the parameters of which can vary by jurisdiction. The output from the model includes the probability of default, loss given default and expected credit losses of a mortgage pool. The results are then



reviewed along with the operational risk review and historical performance data, and are subject to adjustment, as warranted.

(4) DBRS performs a cash flow analysis by incorporating stress assumptions for prepayments, the timing of defaults and recoveries, and interest rates to ensure timely payments of interest and principal distributions to the holders of the rated bonds.

(5) DBRS reviews the legal structure of the transaction and the associated legal opinions.

(6) DBRS evaluates the form and sufficiency of proposed credit enhancement for the requested ratings.

Operational Risk Assessment

OVERVIEW

DBRS operational risk review is designed to evaluate the quality of the parties that originate and service the loans being securitised. In instances where DBRS determines that the originator's or servicer's quality of operations is below average (company is weak in one or more areas of servicing), issuers may need to incorporate certain structural enhancements such as additional credit support, dynamic triggers or the presence of a strong backup servicer in order for DBRS to rate the transaction. In the event that DBRS determines that an originator or servicer is of unacceptable quality (company does not meet minimum industry standards), DBRS may refuse to rate the transaction.

ORIGINATOR REVIEW

An originator's appetite for risk and the underlying quality of its underwriting guidelines can have a significant impact on transaction performance. Therefore, DBRS uses both a qualitative and quantitative approach to conducting its originator reviews and makes comparisons among originators. Historical loan performance, repurchase volume and mortgage insurance claim denial rates, in addition to the items discussed below, are just some of the components that are incorporated into determining the quality of an originator.

DBRS views favorably those originators that have robust guidelines and use reliable means to accurately assess a borrower's income, employment and assets. Furthermore, sophisticated technology and strong fraud-detection procedures can help prevent early payment defaults as well as accurately determine debt-to-income ratios. In addition, the accuracy of appraisals can severely reduce losses to European RMBS investors. Accordingly, DBRS considers a comprehensive property evaluation process a necessity, particularly in today's environment. Furthermore, DBRS believes the participation of the credit risk management, quality control, legal and compliance departments in all aspects of the origination and underwriting process is important in order to identify and mitigate risk.

The originator review process is done to assess the level of adherence to the originator's underwriting guidelines. DBRS expects that issuers' practices conform to all applicable rules and regulations governing consumer finance in the respective jurisdictions.

Originator Review Focus

- Financial condition and ability to provide representations and warranties (reps and warranties).
- Staffing and training.
- Sourcing by product type.



- Use and monitoring of brokers or correspondents.
- Sales and marketing practices.
- Underwriting policies and procedures.
- Recent or planned changes to underwriting guidelines.
- Use of credit scoring and proprietary technology.
- Income, employment and asset verification processes.
- Appraisal process and use of automated valuation models (AVMs), where applicable.
- Appraiser approval process.
- Exception process.
- Fraud prevention techniques.
- Closing and funding process.
- Third-party originators oversight and management.
- Quality control and audit processes.
- Risk management.
- Legal and regulatory compliance.

SERVICER REVIEW

DBRS servicer review incorporates a thorough assessment of the items noted below in an effort to evaluate the quality of a servicer's platform. The effectiveness of a servicer's operation will have a direct impact on security performance and ultimately losses to European RMBS investors. A servicer's strategy for handling loans in default as well as its ability to closely manage loans in foreclosure can stabilise or improve pool performance. Some servicers use predictive dialer systems that incorporate behavioral scores to identify and prioritise the riskiest borrowers. Collection efforts generally escalate in intensity as accounts roll to more advanced delinquency categories. Depending on the stage of delinquency, the servicer may offer a forbearance or modification plan that can include a reduced interest rate, capitalisation of monies owed or debt forgiveness, in addition to a formal payment schedule, to help the account become current.

DBRS views favorably those servicers that have strong monitoring procedures for delinquent accounts. Once an account becomes delinquent, effective collection procedures can minimise losses to investors. Accordingly, DBRS evaluates the quality of the collections strategy and staff in order to determine their success rates in contacting borrowers and determining their ability and willingness to pay. Additionally, DBRS believes that no servicing operation can be successful without a strong seasoned management team that possesses demonstrated expertise in the product(s) they are servicing

DBRS servicer review process typically involves a comprehensive analysis of the company and management, loan administration, customer service, collections, loss mitigation, foreclosure procedure, investor reporting and technology processes. While DBRS does not assign formal ratings to these processes, it does incorporate the results of its operational reviews into the rating process. Below are some of the items that are reviewed as part of the servicer evaluation.

Company and Management

- Company history, ownership and operating experience.
- Financial condition.
- Management experience.
- Staffing, training and retention rates.
- Portfolio size and composition.
- Strategic initiatives.
- Litigation (past, present and expected).
- Cause of termination (if applicable).
- Recent or planned mergers or acquisitions.
- Recent or planned transfer of servicing (rights), if any.
- Runoff rates.
- Internal and external audit results.
- Securitisation history and future plans.



Loan Administration

- New loan boarding process.
- Procedures for boarding accuracy and data integrity.
- Reset notification.
- Cash management procedures and controls.
- Payment processing and controls.
- Exception and suspense management.
- Account reconciliation and timing.
- Post-closing quality reviews.

Customer Service

- Procedures for responding to customer inquiries.
- Strategy and technology.
- Call volume and average time to answer.
- Number of representatives and ratio to call volume.
- Level of call blockage, if any.
- Response times for inquiries.

Collections

- Collection strategies for early-, middle- and late-stage collections.
- Explanation of call and notice cycles by product type.
- Account-to-collector ratio.
- Right-party contact rate.
- Hold time and abandonment rates.
- Use of credit and behavioural scoring and other technology.
- Policies regarding modifications, forbearance and deferrals.
- Property inspections and current property valuation procedures.
- Eviction procedures.
- Charge-off process.
- Use of technology.

Loss Mitigation

- Significant changes (past or planned) in procedures or emphasis regarding workout strategies or timelines.
- Repayment plan, modification and forbearance plan procedures.
- Use of deed-in-lieu, short sales and cash for keys procedures.
- Procedures and timelines for property evaluation (condition and value).
- Approach to fraud detection.

Foreclosure

- Foreclosure process and initiation, non-judicial and judicial states.
- Compliance with timelines by country.
- Property preservation and valuation.
- Bidding instructions.
- Property evaluation, maintenance, repairs and inspections.
- Percent of foreclosure sold through a third party.

Investor Reporting

- Procedures for dissemination of reports to investors and trustees.
- Average number of investors remitted to on a monthly basis (last 12 months).
- Average amount of monthly remittances (last 12 months).
- Number of late remittances in the last 12 months.



Technology

- Core servicing system strengths and weaknesses.
- Capacity remaining in the servicing system.
- Web site availability and usage.
- Procedures for vendor selection and oversight.
- Disaster recovery plans and success of last test.
- Frequency of full-system backup.
- Future initiatives.

INTERNAL CONTROLS

Internal assessments and quality-control reviews are critical in recognising procedural errors that may not be easily detectable. In addition, these reviews can be used to identify trends, training opportunities and exception practices. Frequent checks can assist management in quickly instituting changes to areas needing improvement, as well as benchmarking those results to performance. In addition to the aforementioned reviews, a monitoring process should be in place to ensure that the servicer is in compliance with all applicable laws, rules and regulations and that all employees in customer-facing positions are appropriately trained.

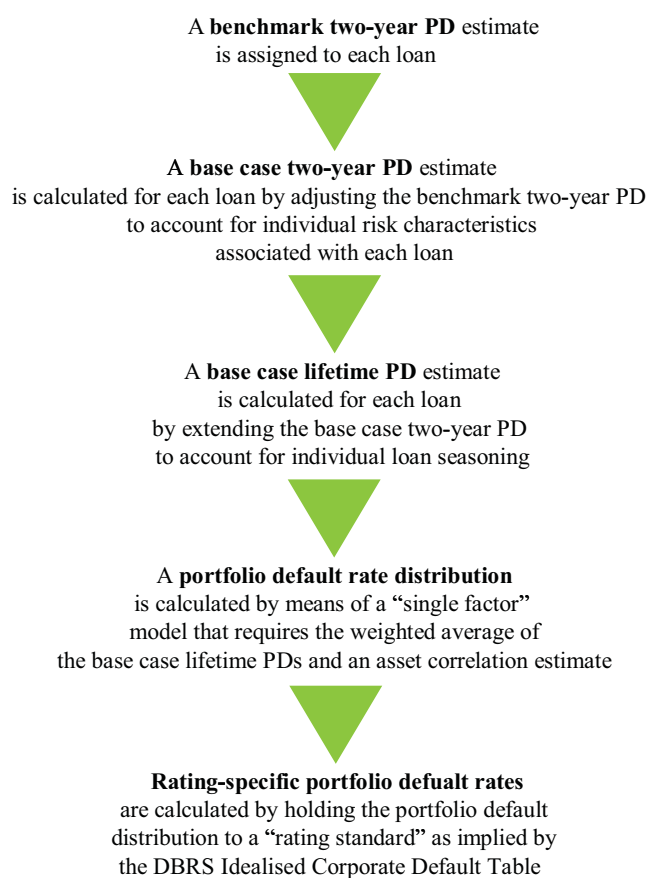
TECHNOLOGY

Technology resources are an integral component of the servicer review process. While DBRS does not subscribe to specific systems architecture, adequate systems controls, consumer privacy protection and backup procedures, including disaster recovery and business continuity plans, are considered critical processes and should be in place. DBRS expects servicers to have the appropriate staff and controls in place to ensure website availability, account maintenance and enhancements. Sophisticated technology, with robust functionality, is viewed favorably by DBRS as it often helps bring large efficiencies to the servicing operations in addition to more predictability in terms of loan performance.

Probability of Default

SUMMARY

This section describes the DBRS methodology used to calculate loan-level probability of default (PDs) and portfolio-level default rates for European residential mortgage pools. One important component of this methodology is an approach to calculate base case two-year and lifetime PD estimates for individual mortgage loans. The approach also includes the creation of a portfolio default distribution, which allows for the extension to rating-specific portfolio default rates. A summary of the methodology used to calculate loan-level PDs and portfolio default rates is given on the following page and described in detail in the following pages.



THE BENCHMARK TWO-YEAR PD ESTIMATE

Each loan in the mortgage portfolio is initially assigned a benchmark two-year PD, which varies by jurisdiction and, in some cases, by mortgage product. The benchmark two-year PD is calibrated based on market-wide loan-level data and the related default experience. Originator- and servicer-specific historical performance data is often used to adjust the two-year PD on a transaction basis. The market data used for the two-year PD covers different economic stress scenarios: good, normal, bad and housing crash. DBRS classifies these scenarios based on various economic and market indicators such as unemployment, GDP growth, home price appreciation and depreciation and repossessions. The benchmark two-year PD is adjusted upward or downward on a loan-by-loan basis depending on the individual loan characteristics (see the following section).

The benchmark loan PD was calculated over a two-year time period for a number of reasons. Firstly, during this period, borrower defaults are most dependent upon lender’s underwriting standards and loan characteristics. Afterwards, the impact of loan risk attributes diminishes, and PDs are more influenced by macroeconomic variables. Secondly, in certain jurisdictions where credit bureau scores are available or will be available for third-party uses, DBRS intends to include, but not to rely solely on, credit bureau scores to help assess the credit risk of mortgage loans. For example, generic credit scores created by the bureaus active in the United Kingdom (e.g. Experian, Equifax and Call Credit) are predictive measures of default and are extensively used by a range of mortgage and other lenders. The scores (e.g. Delphi, Risk Navigator and CallScore) summarise borrower credit history and condense many relevant performance factors (e.g. borrower behaviour on all credit lines, level of indebtedness, geographic default data) into a single numeric value. Since credit bureau scores are commonly calibrated to reflect performance over a short period of time, generally no more than two years, DBRS has developed a methodology that can easily incorporate the scores if they are made available.



THE BASE CASE TWO-YEAR PD ESTIMATE

The benchmark two-year PD is then adjusted on a loan-by-loan basis to create the base case two-year PD estimate per loan. These adjustments are to account for borrower, property and loan product factors that increase or decrease the credit risk associated with a particular loan. An overview of the risk-adjustment factors used is provided in this section.

A more qualitative evaluation of underwriting standards, credit policies and servicing practices is then overlaid on the estimated loan-level PDs to adjust for servicer- or originator-specific influences on loan credit performance. Further adjustments may also be necessary in the case of significant concentration risks.

The following section focuses on the loan, borrower and property characteristics that DBRS considers to be influential on a borrower's propensity to default. The default behaviour of each mortgage loan in the pool is forecast by integrating past credit performance information with additional characteristics that may influence a borrower's likelihood of default. Each characteristic is associated with a multiplicative factor, different by jurisdiction, that adjusts the two-year benchmark PD up or down.

BORROWER CHARACTERISTICS AND CREDIT RISK

Credit Risk Band and Adverse Credit History

In order to differentiate between the credit quality of borrowers, each loan is assigned to a credit risk band, based on past credit performance information. Credit risk bands range from "A" to "D," with "A" borrowers considered to be the least risky and "D" borrowers having severe current or past credit problems. The available information currently used by DBRS to determine the credit risk band is the following:

- Previous credit impairments.
- Any prior bankruptcy or the equivalent within each jurisdiction.
- Current arrears on mortgage.

Adverse credit history is a key differentiator for default risk because individuals who have suffered debt problems in the past have a higher propensity for arrears and defaults on future debt repayment. Significant previous financial difficulties are indicated by arrears or defaults on loans, County Court Judgements in the UK, Judgements in Ireland or BKR (Bureau Krediet Registratie) codes in Netherlands or insolvency. Lending to borrowers with adverse credit history implies higher default risk compared with mainstream lending and is evidenced by significantly higher mortgage arrears and default performance compared with the prime mortgage market.

When determining the credit risk bands, DBRS prefers to incorporate external bureau scores, when available, as an additional measure, but we are very cautious about relying solely on such scores because the reliability of credit scores remains to be tested in stressful environments.

Employment and Other Income-Related Variables

Borrower propensity to default is clearly related to the ability to make timely mortgage repayments on an ongoing basis. DBRS regards affordability and other income- and employment-related aspects as very important, particularly after noticing the high default rates of recent affordability products in some European countries. In addition to this, consumer indebtedness levels have grown substantially in recent years, and the current financial crisis has raised serious concerns as to the ability of people to repay their debts.

The following sections outline employment and other income-related features that DBRS considers to affect performance behaviour. These features are for owner-occupied properties only and do not apply to buy-to-let (BTL) products, which are discussed separately in a following section.



Self-Certification

Self-certification is used by borrowers who want to obtain a mortgage without having to demonstrate their earnings to a standard required by conventional mortgage underwriting criteria. Here, applicants simply declare their own income, without having to provide the lender with any underlying documentation (e.g. pay slips, audited accounts). Typically, borrowers who seek to self-certify are self-employed, commission-based or contract workers. Self-employed borrowers may choose to self-certify for a number of reasons. Firstly, most lenders require self-employed workers to provide two to three years of audited financial accounts, meaning that more recent self-employed borrowers would be unable to satisfy this request. Secondly, audited accounts and/or current tax returns are often time lagged and may not show the latest figures of a borrower's income. Thirdly, self-employed borrowers may also perceive that supplying the necessary documentation would be too onerous and time-consuming. Commission-based workers may also choose to self-certify, as they receive a salary with a high proportion of bonus payments and hence show a large degree of variability in income over time. Contract workers and those with incomes from a variety of sources usually choose to self-certify because their total earnings may not otherwise be considered under a traditional mortgage.

There are additional risks with self-certified mortgages, and the concept that a self-certified borrower could not afford the loan under normal lending criteria is a common one. Historical data indicated that mortgage lenders generally have a higher level of material arrears for their self-certified business compared to mainstream lending. Lenders endeavour to offset this risk by a variety of ways, the most common being:

- Most self-certified mortgage providers pass the applicant's stated income through a plausibility check to ensure their stated job type fits within a reasonable salary range;
- More conservative credit scoring cuts are taken into account when assessing self-certified mortgage applications, as well as lower LTV ratios so as to deter borrowers from taking out a mortgage that they cannot afford;
- Fraud detection systems in various jurisdictions also discourage systematic fraud in the self-certified market.

Despite these additional safeguards, the higher level of arrears experienced with this product type means that DBRS considers self-certified loans to be riskier than benchmark loans. Note that DBRS considers self-certification products to employed borrowers riskier than those to self-employed borrowers, given that a self-employed borrower may have a more "legitimate" reason for self-certification (such as the burden of supplying audited financial accounts).

Self-Employed

Self-employed borrowers who do not self-certify their income need to provide the mortgage lender with documentary evidence of their earnings (e.g. latest tax payments). However, compared with borrowers who are employees, self-employed borrowers tend to have lower stability in terms of monthly income. In addition, self-employed borrowers often need to undertake large financial investments in order to set up their own business, which may make them more vulnerable in an increasingly stressful financial environment.

Loan-to-Income (LTI)

LTI is a measure of loan affordability and is commonly used by lenders to determine how much they are prepared to advance on a mortgage. LTI is calculated by dividing the loan balance by the total income for the household (e.g. the sum of incomes in the case of multiple borrowers). Many lenders also use more sophisticated affordability measures to take into account other financial commitments (e.g. council tax, unsecured loan repayments, childcare costs, utility bills, etc.), but usually in conjunction with LTI measures. Although it is likely that more complex affordability measures are better indicators of risk than a simple LTI, the components of these measures are not consistent across lenders. As such, DBRS considers LTI a simple but effective means of assessing affordability.



A higher LTI ratio is a sign of greater financial commitments and makes a borrower more susceptible to default in case of a life changing event such as divorce or loss of job, or an economic shock such as interest rates increases. DBRS applies a risk adjustment to the benchmark two-year PD based on LTI ratio. In certain jurisdictions, codes of conduct are applied to restrict excessive LTIs (i.e. Dutch Autoriteit Financiële Markten Code of Conduct). Although not always binding, these codes could potentially restrict lending in more stressful periods to prevent elevated losses to certain borrowers.

Single Income

When mortgage repayments are serviced by two separate incomes, if one income becomes unavailable (e.g. as a result of unemployment), being able to rely on a co-borrower's income mitigates the likelihood of default. As such, the repayments on a mortgage serviced by a single income attract a multiple to the benchmark PD rate.

MORTGAGE LOAN CHARACTERISTICS

Loan-to-Value (LTV)

LTV is the ratio between the principal balance on the mortgage and the appraised value of the property serving as security for the loan itself. The input used by DBRS in the default model is the LTV at the time of securitisation. This is calculated by summing all of the outstanding balances from every loan secured by the same property (e.g. first-lien and second-ranking mortgages) and dividing the total by an estimate of the current market value of the property.

In the case of flexible loans, the maximum drawable amount is taken into account instead of the outstanding loan balance.

Higher LTV ratios are associated with increases in the likelihood of default, attributable to the progressively smaller portion of equity that the borrower has in the property. Equity is the difference between the value of the property and the amount of all loans secured against it. The smaller the equity, the smaller the potential financial benefit the borrower can retain from the property, and the lower the incentive to maintain loan repayments.

DBRS approximates the relationship between LTV and the likelihood of default for each jurisdiction. The higher the LTV, the more likely the loans are going to default. In a traditional market, the risk adjustments tend to increase at a faster speed when a LTV is above 80%. When LTV exceeds 100%, the increases can be exponential.

Given the different tax regimes and customs throughout Europe, these relationships deviate substantially. In countries such as the Netherlands where the average LTV is considerably higher, defaults are much less sensitive to the change in LTV until it reaches 100% LTV.

Subsidised Mortgages

DBRS considers loans granted on the basis of government subsidies or other forms of support as riskier compared with standard mortgage loans due to the intrinsic weaker profile of the borrower.

Loan Purpose

Borrowers apply for mortgages primarily for: home purchase, re-mortgage, debt consolidation, equity release and rehabilitation.

Typically, when borrowers re-mortgage, they use the proceeds from the re-mortgage to pay down an already existing mortgage, with the same property being used as security. The main motivation for this type of re-mortgage, also referred to as refinancing, is usually to take advantage of a more favourable interest rate offered by an alternative mortgage provider.



Over the last few years, strong house price appreciation persuaded many borrowers to re-mortgage in order to release equity from their property. As such, a growing proportion of borrowers are raising capital from their properties, hence taking on more debt. Debt consolidation is a particular form of equity release re-mortgaging, where one loan (e.g. the re-mortgage) is taken to pay off other debts already existing (e.g. unsecured loans, credit lines, etc.).

DBRS considers loans granted for purposes other than buying a property to be associated with a higher likelihood of default compared with traditional mortgages. Being a form for increasing credit exposure, they contribute to stretch borrowers' finances, potentially compromising their ability to repay their debts.

Repayment Type

There are currently two main mortgage repayment methods in Europe: repayment and interest-only (IO), with many variations of each of these two types (e.g. a mixture of the two, where an IO reverts to repayment after a certain time period, investment backed, etc.).

In a standard repayment mortgage, both interest and some of the capital borrowed is paid back over time to ensure the mortgage is totally paid off by the end of the term. In contrast, IO mortgages only require the repayment of the interest on the initial principal balance until maturity, when the borrower repays the principal balance.

There are a number of reasons why a borrower would opt for an IO loan. Firstly, borrowers with reduced financial capacity who seek for a lower initial installment. Secondly, borrowers who require more flexibility in the way they repay their mortgages. For example, those who have fairly low earnings but expectations for extra financial income (e.g. bonuses) can benefit from smaller regular payments of interest and a more flexible approach to repaying the principal.

With high levels of unsecured consumer indebtedness, combined with high house prices, borrowers have considered IO loans as a way to afford properties that they may not be able to afford with a regular repayment scheme. As such, DBRS has some concern that IO borrowers are more likely to have stretched financial circumstances. In addition, there are further concerns around borrowers' ability to pay back the entire balance due on the mortgage at the maturity date. Although borrowers can refinance at maturity, the market environment at that future date is unknown and, as such, exposes borrowers to refinance risk.

Loan Term

The maximum term offered by European mortgage originators varies by jurisdictions and lenders. DBRS regards repayment mortgages with a final maturity greater than 25 years as riskier compared with shorter amortising products. There is a general concern that a borrower may choose a long amortisation term in order to reduce his or her monthly payments and, as with IO products, could be indicative of some financial vulnerability.

Loan Size

Given that mortgage providers generally limit the maximum loan size based on income multiples, larger loan amounts are only available to borrowers with higher incomes. DBRS regards larger loans (jumbo loans) as riskier than smaller loans. The rationale behind this view is that higher incomes are subject to greater volatility, particularly in an event of an economic downturn. Typically, these borrowers are more likely to rely on significant bonuses and may find it difficult to maintain their financial status when forced to move to a new job position (as the result of a changing economic environment).

In order to account for the variety of economical environments across Europe, DBRS defines jumbo loan based on country-specific limits.



Second Lien

A second-lien mortgage is a subordinated loan taken on a property already used as security for an existing mortgage. Lien positions differentiate levels of subordination in the rights of creditors to receive proceeds from the sale of the mortgaged property in the event of borrower default. Second-lien mortgages, although a common feature of many mortgage finance products, generally have a different purpose across Europe. In some jurisdictions, second-lien mortgages are generally taken out as an equity release tool for raising capital or to finance the down payment of a purchase. Second-lien loans that are potentially granted to borrowers who are unable to re-mortgage easily to release equity may represent a riskier profile than the benchmark.

Loan Product

DBRS applies risk adjustments to loan products where there is the potential risk of payment shock (i.e. a sharp increase in regular mortgage payments as a result of a change in the interest rate on the loan). Fixed rate (short term) loan products are seen to have the most potential for significant payment shock, as they do not adjust with increases in the base rate. If interest rates increase during the fixed period, the borrowers become exposed to a substantial increase in their regular mortgage payments at the time of the switch to standard floating rate. Loans that track the ongoing changes in interest rates over time are not subject to this risk adjustment.

Buy-to-Let (BTL)

A BTL mortgage is for the purchase or re-mortgage of a residential property used for investment purposes. Here, the property is let to tenants as opposed to direct occupation by the borrower. The expansion of the BTL market in some jurisdictions is attributable to strong house price appreciation and good rental demand in the past decade. Growing volumes, however, have been accompanied by a growing number of BLT arrears and repossessions. DBRS considers that this increase has been potentially driven by a number of factors:

- A decrease in the minimum required rental coverage ratio, which is computed as the expected monthly rental income divided by the monthly mortgage repayment;
- Higher LTV ratios, mainly as a result of increases in the maximum amount lent to landlords;
- Changes in the type and experience level of borrowers accessing the residential property market; a growing proportion of new entrants are “amateur” landlords.

BTL mortgages are also exposed to the risk that the property may not be tenanted for part of the year, meaning the landlord may need to rely on alternative income to cover the loan repayment. Lenders try to mitigate the above exposure by requiring the rental coverage ratio to exceed 100%, but the surplus rent may not be sufficient to cover long terms without tenancy, as well as other repairs and maintenance costs.

Although a BTL loan attracts a multiple that increases the PD in comparison with the benchmark PD, note that these types of mortgage loans are not exposed to the employment or income multiples that are associated with owner-occupied properties.

Credit Risk Layering

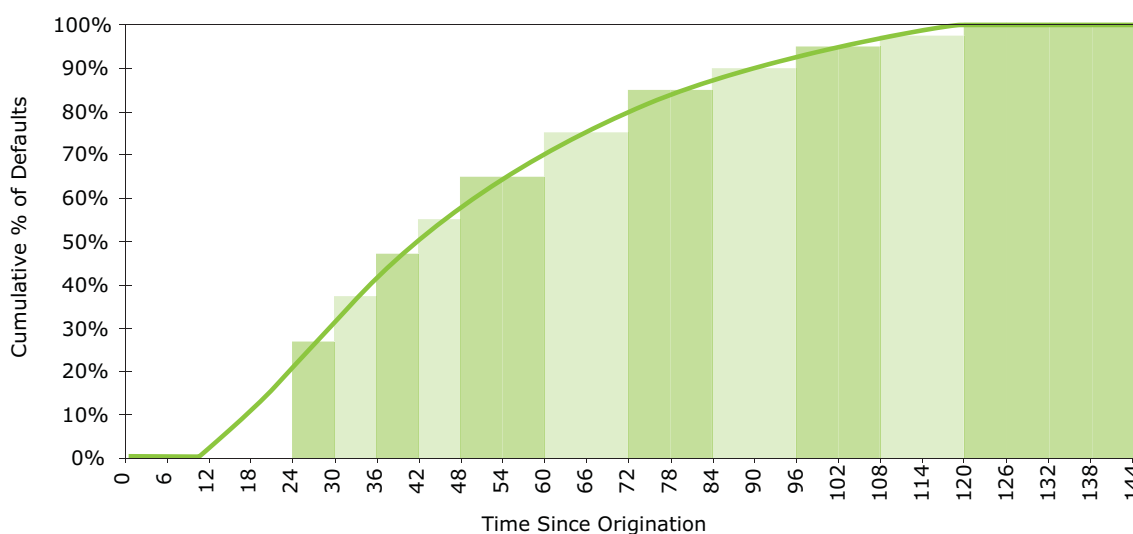
DBRS makes a base case PD adjustment to account for risk layering within a single mortgage loan; that is, the simultaneous presence of multiple risk factors is assumed to have an adverse effect on PD over and above that predicted by the single multiple associated with each component. Credit risk layering has been an important contributor to the rise of arrears and defaults in the U.S. mortgage market in recent times, and although the presence of credit risk layering in the European countries has not been as prevalent as in the United States, DBRS considers this to be an important element in ultimate default behaviour.

Simultaneous risk elements include combinations of high LTV (indicating minimal borrower down payments), past credit problems (e.g. past CCJ and/or bankruptcy), and high LTI ratios and/or self-certification. Additional risk layers may be assigned for specific countries and jurisdictions.

THE BASE CASE LIFETIME PD ESTIMATE

In order to expand the two-year loan PD estimates to “lifetime” expectations, the two-year estimate is extended by means of an assumed cumulative default distribution. The cumulative default curve for mortgages follows a fairly stable pattern over both time and different data sources, with the majority of defaults on a static portfolio occurring by the end of year five (60 months). The assumed cumulative default curves are different for each European jurisdiction and takes into account historically perceived cumulative default distributions. A sample cumulative default distribution is given in the graph below. Note for simplification that the fitted curve has been divided into six- to 12-month segments (this also allows for more stability in the lifetime default estimates over small changes in seasoning).

Figure 1: DBRS Sample Cumulative Default Curve



In order to calculate the lifetime PD estimate for a single loan, the percentage of cumulative defaults that should have occurred by the number of months the loan is seasoned (the number of months since origination) plus 24 months (the length of time the two-year PD estimate is predicting forward) is derived from the assumed cumulative default distribution shown in Figure 1. Consider the following example where a loan is seasoned for six months and has a current two-year PD estimate of 3%. The six-month seasoning plus the 24 months takes the loan to 30 months in the cumulative default curve. Reading from the bar chart plotted above, the percentage of cumulative default assumed to have occurred by 30 months is 37.5% (note that this percentage will be the same for all loans seasoned between six months and 12 months). This means that the two-year PD estimate of 3% represents 37.5% of the lifetime PD estimate. The two-year PD estimate therefore needs to be multiplied by $100\%/37.5\%$ (or 2.67) to get the lifetime PD estimate ($3\% \times 2.67 = 8\%$).

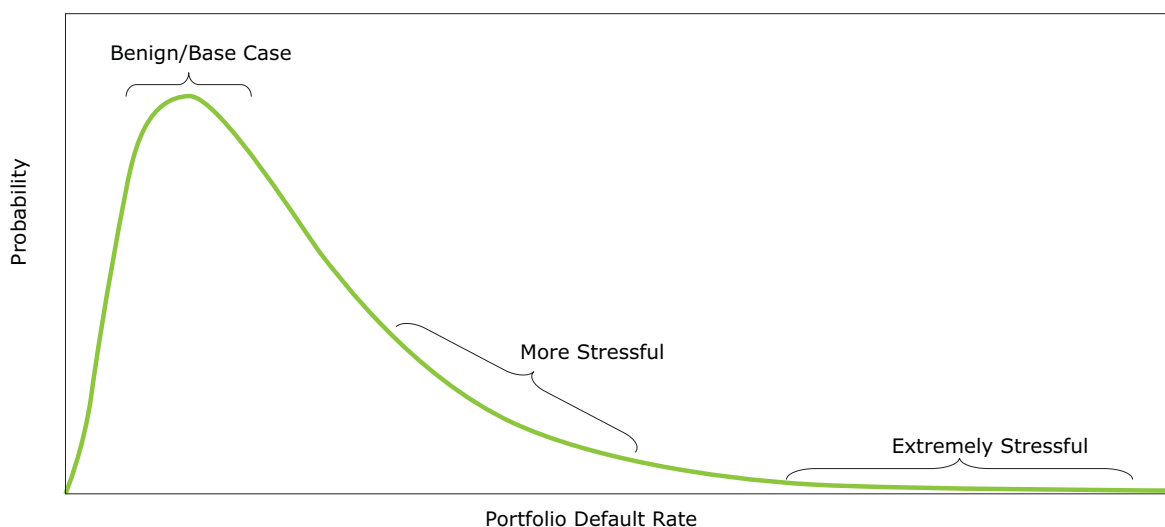
PORTFOLIO DEFAULT RATE DISTRIBUTION

The analysis described in the previous section details the approach used to estimate “lifetime” base case loan level PDs. These estimates have been developed from European loan- and portfolio-level mortgage credit behaviour and extended to lifetime PDs using a standardised cumulative default curve. The results represent a B rating scenario. Under more stressful economic conditions, however, a portfolio will exhibit a higher default rate than the base case.

DBRS assumes that for a single portfolio of mortgage loans, there is a distribution of potential future portfolio default rates. The default rate that is exhibited by a portfolio is a function of the base case performance and the prevailing economic conditions, as represented in Figure 2. Given that mortgage portfolios are typically very large (e.g. greater than 1,000 loans), there is generally no need to simulate the default of each loan to create a distribution of defaults. A given loan may or may not default, but

with such a large portfolio, the loss incurred by a single loan is negligible, and the primary concern is the overall portfolio default rate. As a consequence, simple analytical models can be used to estimate the portfolio default distribution, in particular the “tail” behaviour of the distribution that extends well beyond historically observed mortgage default rates.

Figure 2: Example Distribution of Mortgage Portfolio Default Rates



The framework used to approximate a distribution of mortgage portfolio default rates is a modified version of the single factor Gaussian credit loss model first proposed by Vasicek (1987).¹ This model allows for the creation of a hypothetical distribution of mortgage defaults using two parameters: the mean (or expected) portfolio default rate and the sensitivity of borrowers to changes in the economic environment.

The mean of the portfolio default distribution can be assumed to be the weighted average of the base case lifetime PDs.² The variation in the distribution is determined by a measure of borrower sensitivity to macroeconomic effects. The influence of the economy, despite its complexity (e.g. gross domestic product (GDP), interest rates, unemployment), can be approximated as a single factor that influences borrowers' propensity to default. Sensitivity to this factor is equivalent to assuming individual mortgage borrower performance is correlated, where the higher the sensitivity, the higher the correlation. For a more technical description of the single factor model framework, please see Vasicek (1987) or Gordy (2003).³

RATING-SPECIFIC PORTFOLIO DEFAULT RATES

The analysis described in the previous section results in an analytical distribution of potential default rates for the mortgage pool. Given that a DBRS rating ultimately addresses the probability of default of a tranche backed by the mortgage pool, the distribution can be analysed to determine a portfolio default rate that is consistent with a given rating. This is done by determining the probability that a certain default rate will be exceeded and ensuring that this probability is less than or equal to the default probability of a benchmark bond. To ensure consistency with portfolio models in other asset classes, the DBRS idealised corporate default table is used as the benchmark.

1. Vasicek, O. (1987). “Probability of Loss on Loan Portfolio.” Working paper, Moody’s KMV.

2. DBRS floors the base case portfolio PD estimate at 1%. In order to continue to rank-order portfolios with very low expected default rates, a scaling factor that decreases as PD increases is applied to all base case portfolio expected default rates below 2%.

3. Gordy, Michael B. (2003). “A Risk-Factor Model Foundation for Ratings-Based Bank Capital Rules,” *Journal of Financial Intermediation*. 12, pp. 199–232.



Loss Given Default

This section describes the DBRS methodology used to calculate the loss given default (LGD) for European residential mortgage portfolios. This approach is primarily centred on the potential market value decline a foreclosed property could experience compared with its valuation at the time of portfolio assessment. As such, the DBRS analysis has focused both on foreclosed property values compared with the general market norm and on how they may behave under more stressful conditions.

LGD OVERVIEW

Upon default, the property is repossessed and sold to recoup the amount owed by the borrower. Upon sale, the amount owed by the borrower does not only include the loan principal balance; there will also be costs associated with the foreclosure process and the forced sale, and given that there is a lag between severe delinquency status and the actual property being sold, the borrower will also owe accrued interest. Note that the LGD calculations described in this report exclude accrued interest, as the primary objective of the DBRS credit analysis is to estimate principal loss only.

LGD is calculated by taking the difference between the outstanding principal loan balance owed by the borrower (also known as exposure at default, or EAD) and the recoveries deriving from the sale of the property and any other form of credit mitigation in place (e.g. mortgage insurance payments), net of any costs and prior ranking loans. This difference is then expressed as a percentage of the EAD.

$$\text{LGD} = \frac{\text{EAD} - (\text{property foreclosure sale price} - \text{costs} - \text{prior ranking loans})}{\text{EAD}}$$

In Europe, most loans are originated with LTVs that are lower than 100%; that is, the loan principal balance advanced is less than the value of the property. Therefore, upon borrower default, the sale proceeds should cover the outstanding loan balance, and losses should be minimal. If the market value is eroded for any reason (property neglect, economic downturn) and repossession and sale costs are netted from recoveries, then more extreme losses will be observed. The decrease in the property value is commonly referred to as a market value decline (MVD) and is clearly a key factor when determining expected losses for mortgage default loans.

COMPONENTS OF LGD

The DBRS methodology for the estimation of each of the contributing components to LGD (e.g. the amount owed, the costs, the property valuation and the assumed recoveries upon sale) is described in the following pages.

Principal Amount Owed (Exposure at Default, or EAD)

DBRS expects that loans will default relatively early in their life, with the most default vulnerability occurring between 12 and 60 months. Loans defaulting within this period are unlikely to show significant decreases in the principal amount owed at origination. Loan products that do amortise tend to show minimal decreases in the first years of their life, and there are also many non-amortising products now being originated in Europe. In addition, although a borrower may manage to pay off more principal balance through partial prepayments, it is less likely that this borrower type will subsequently default. Therefore, DBRS assumes that the principal amount owed at default is the same as the balance at the time of the portfolio assessment (e.g. the date of pool cut).

Current Property Value

DBRS makes adjustments to the given property valuation on the basis of the property valuation method, and the time since valuation (in order to account for any increase or decrease in the property valuation since the given valuation date).

Property Valuation Methods

There are a number of methods that are currently used to value properties in Europe to assess their adequacy as security for a mortgage advance. In some jurisdictions, lenders have relied on a full physical valuation, where a property expert such as a chartered surveyor would visit the property in question. The surveyor valuation is based on the condition of the interior and exterior of the property, in addition to comparative sales in the vicinity and general market activity. However, a number of alternative valuation solutions have evolved, such as Drive-by Valuation and Automated Valuation Models in UK and in the Netherlands. In general, these alternative solutions are restricted to either less risky loan characteristics (such as low LTV loans) or situations where there is a known past physical valuation (e.g. re-mortgages, further advances, equity release).

- **Drive-by Valuation:** A valuer visits the property and assesses it from the property boundary. Comparative sales and market activity also contribute to the final valuation.
- **Desktop Valuation and Automated Valuation Models (AVMs):** In both desktop and AVM valuations, a property is valued without any physical inspection. With a traditional desktop valuation, a house price index or a comparable property evaluation is used to estimate the property value, usually from a past known full property value. A more formalised version of the desktop valuation is derived using an AVM, which assigns a property valuation using a statistical algorithm that can run on an automated basis once certain property characteristics are entered by the user. The AVM derives values based on an analysis of comparable sales in the area and property value indexation (e.g. from repeated sales). The accuracy of an AVM generally depends on the number of suitable comparative properties and the age of their valuations. Therefore, AVM performance is best when the property comes from a densely populated homogenous area with a high number of property sales. This statement is true for all methods of valuation. AVMs, however, are unique in that each valuation produced is accompanied by an independent measure of “confidence.”

AVM confidence measures are based on the number, similarity and time of the comparable properties used to calculate the target valuation. The more similar and numerous the comparables are, and the more recent the sales data, the higher the level of certainty that can be associated with the target property valuation. Surveyor, desktop and drive-by valuations have no such measure of accuracy. This, however, does not mean they are immune to the specifics of a particular market, which can make valuations inaccurate and volatile (e.g. sparsely population regions, unique property features, or low comparable sales).

Adjustments Based on Valuation Method

DBRS considers a full surveyor valuation as the standard, despite in certain situations it also being susceptible to a degree of inaccuracy. As a consequence, no adjustments are made to such valuations apart from indexation when appropriate (see below). The other property valuation methods, in some circumstances, are adjusted downward. This is done to take into account the potential risk of a property having been overvalued (which would imply a lower LTV than the actual; hence, PD and LGD measures would be underestimated).

Property Indexation

The MVD is applied to the estimated property value at the time of the portfolio assessment. Property valuations are updated by a property indexation, when available, or produced by appropriate AVMs, subject to adjustments. Average house price appreciation is applied to the property value up to the date of the portfolio assessment, or the most recent available indexation.

House price inflation adjustments are calculated on a region-dependent basis. Depending on the markets and related macroeconomic environments, DBRS may or may not account for any home price appreciations. Even if it does, the approach is generally to account for only 50% of the average reported increase. In the case of negative appreciation, however, the entire amount of depreciation is applied.



Sale Price of the Foreclosed Property

DBRS believes a forced sale as a result of property repossession will result in a discounted sale price relative to the norm. Therefore, although average historic house price indexes are useful in estimating potential MVDs for the housing market as a whole, they do not indicate how repossessed properties performed relative to the average.

The Benchmark MVD

It is important to note that housing market cycles differ from country to country, hence DBRS considers a wide range of macroeconomic variables to determine the benchmark MVDs within each European jurisdiction.

Adjustments to assumed MVDs for repossessed properties are usually made to capture additional risks associated with repossession sales. Analyses of historical house price declines do not always take into account how the sale prices of repossessed properties would behave in severe economic environments, such as those experienced in several European markets over the last few years. Even in a benign housing market, DBRS generally assumes a MVD of 20% at a minimum, to capture distressed sales and beaten-down prices.

In DBRS MVD analysis, foreclosed property MVDs have been estimated from recent and projected home price declines, portfolio historical loss performance, taking into consideration the cumulative default rates and LTV distributions. In addition, a significant added value to the analysis was also given by access to loan-level information for foreclosed properties, where both the original valuation, valuation date and repossession sale price were available.

MVD Benchmark Adjustments per Property

The benchmark MVD is then altered on a property-by-property basis depending on various borrower and property factors that DBRS assumes to influence a property resale value. The resultant MVD per loan represents the decline in the repossessed property value in a single B environment. The factors that result in MVD adjustments are property location and, property size and property type.

- **Property Location Adjustments:** Historical house price trends in Europe have shown considerable and persistent regional differences. In certain geographical areas, especially those far from central cities, historical prices tend to display higher volatilities as demand weakens. DBRS applies a multiple that adjusts the benchmark MVD when it sees fit to differentiate regional demands within each jurisdiction and its regions.
- **Property Size Adjustments:** Very expensive and inexpensive properties have more volatile and less liquid resale markets because of the more limited number of potential buyers. In addition, the scarcity of good comparable valuation benchmarks increases the potential for the valuation of these properties to be overestimated. DBRS increases the MVD for property valuations for very expensive and inexpensive properties. This adjustment is computed by comparing subject property to an average property valuation within the region, and as such varies by country and region.

Sale Price of the Foreclosed Property: Overall Calculations

For every loan in the mortgage pool, DBRS determines an updated valuation, with indexation applied up to six months prior the pool cut-off date, and then computes the expected sale price at repossession by subtracting from this value the associated MVD.

Costs

The lender bears a number of costs associated with loan delinquency, repossession and subsequent property resale; hence, these payments need to be subtracted from the sale proceeds. Costs include legal fees (e.g. as the result of possession, eviction and property sale procedures), expenditures associated with any property maintenance the sale requires and the estate agency charge. Estate agency fees are usually calculated as a



percentage of the sale price of the property and are therefore based on the assumed property value after the MVD has been accounted for.

Prior Ranking Loans

For second-lien mortgages, any prior ranking balance is taken into account and deducted from the property foreclosure sale price. This derives from the fact that, as mentioned earlier, lien positions differentiate levels of subordination in the rights of creditors to receive proceeds in case of foreclosure.

LGD PER RATING LEVEL

Foreclosure MVDs per Rating Level

DBRS assumes that MVDs for foreclosed properties are a function of the prevailing economic situation. DBRS generally assumes a base case MVD of no lower than 20%, and that MVDs increase as rating levels increase. Instances of portfolio-wide market value declines at the high extremes (e.g. 50% to 60%) occur rarely and under stressful economic scenarios (e.g. AAA).

Loan-Level and Portfolio-Level LGD Calculations

On a loan-level basis, LGDs are computed for all rating scenarios using the following process. Firstly, the property value at foreclosure is estimated by combining all valuation adjustments (e.g. indexation and valuation method). The sale price at foreclosure is then derived using the appropriate loan-level MVD at each rating scenario. Given that MVDs are rating dependent, the assumed costs will then vary accordingly, because they are a function of the foreclosed sale price. LGD is then calculated by subtracting the expected foreclosed sale price from the EAD and adding costs and any existing prior ranking balance, and then dividing the remainder by the EAD itself.

Calculating portfolio-level expected losses by simply taking the weighted average of the loan-level LGD and multiplying it by the portfolio-level PD could result in biased estimates. Portfolio-level expected loss is accurately derived only when it is determined as a weighted average on a loan-by-loan basis. This approach prevents the impact of different levels of co-variance between loan-level PD and LGD estimates. This approach, however, only results in a portfolio PD and a portfolio expected principal loss (EL) estimate per rating level, with no portfolio LGD estimate.

Separate estimates of portfolio-level PDs and LGDs are required, however, to correctly run the subsequent cash flow analysis (to take into account the impact of the length of the foreclosure process on lost interest). As such, portfolio LGD values are derived from the portfolio PDs and corresponding correctly calculated ELs (as described above) by dividing the portfolio EL by the portfolio PD at each rating level.

Cash Flow Analysis

SUMMARY

DBRS undertakes a detailed cash flow analysis (currently in Intex) to ensure timely payments of principal and interest to the bonds. The cash flow modeling assumptions DBRS uses for rating RMBS transactions focus on the prepayment speeds, timing of defaults and recoveries and interest rate stresses. As indicated in the table on the following page, multiple scenarios based on the combinations of these assumptions are often applied to test the resilience of the rated bonds. Please note that in a low interest rate environment, flat and downward interest rate stresses may be combined into one in the DBRS cash flow analysis.



Table 1: DBRS Standard Cash Flow Stress Scenarios*

Scenario	Prepayments	Default Timing	Interest Rate
1	Slow	Front-loaded	Upward
2	Mid	Front-loaded	Upward
3	Fast	Front-loaded	Upward
4	Slow	Back-loaded	Upward
5	Mid	Back-loaded	Upward
6	Fast	Back-loaded	Upward
7	Slow	Front-loaded	Flat / Down
8	Mid	Front-loaded	Flat / Down
9	Fast	Front-loaded	Flat / Down
10	Slow	Back-loaded	Flat / Down
11	Mid	Back-loaded	Flat / Down
12	Fast	Back-loaded	Flat / Down

* Additional scenarios may be necessary depending on the pool attributes and transaction capital structure.

Loss Expectation

As described in previous sections, the first step in analysing a pool of mortgage loans is to determine the loss expectations for each rating category. DBRS uses the loan-level RMBS model to derive default probabilities and loss given defaults based on the pool's collateral composition. When determining the pool's overall credit enhancement, external factors are also taken into consideration. These external factors include the origination process, the capability of the servicer and the originator's historical performance.

Excess Spread

Analysing cash flow and valuing excess spread is the next step in the process. Non-conforming mortgages bear higher interest rates than their prime counterparts to compensate lenders for the greater credit risk of these loans relative to prime loans. In securitisations, there is a potential of a sizable strip of excess cash after paying bond coupons and other related fees. This strip of cash is known as excess spread.

Excess spread can be used as the first layer of protection against credit losses. It is crucial to appropriately value excess spread because it can sometimes represent a sizable portion of total credit enhancement. DBRS considers numerous risk factors when evaluating a transaction's excess spread. These risk factors include the following:

- Prepayment speeds.
- Timing of defaults and recoveries.
- Interest rate mismatches.

This methodology examines each risk factor and the manner in which it affects excess spread evaluation.

Finally, the cash flow assumptions described in this section generally represent the DBRS standard stresses. Depending on the pool attributes and transaction capital structure, DBRS often incorporates a dynamic cash flow analysis derived from these standard stresses, which includes applying various prepayment speeds, front- and back-loaded default timing patterns, as well as upward, flat and downward interest rate stresses to test the resilience of a bond. An appropriate rating is one that can withstand the combination of DBRS-modeled cash flow stresses without the rated class incurring any interest shortfalls or principal writedowns.



PREPAYMENT SPEEDS

Prepayment speed measures the rate at which borrowers make their principal payments prior to the scheduled maturity date. Prepayments reduce the outstanding principal balance of a mortgage pool, thus reducing excess spread. The faster the prepayment speeds, the quicker excess spread is depleted.

Historical data shows a correlation between a borrower’s prepayment behaviour and interest rate movements. Generally, in a declining interest rate environment, borrowers are motivated to refinance and may do so if their credit profile allows. Conversely, prepayment speed typically slows as interest rates rise. The recent housing and economic crises in various jurisdictions have created an interesting phenomenon. Despite extremely low interest rates, voluntary prepayments remain extremely slow. Faced with either blemished credit histories or insufficient home equity and tougher underwriting standards, many existing borrowers find it difficult to refinance.

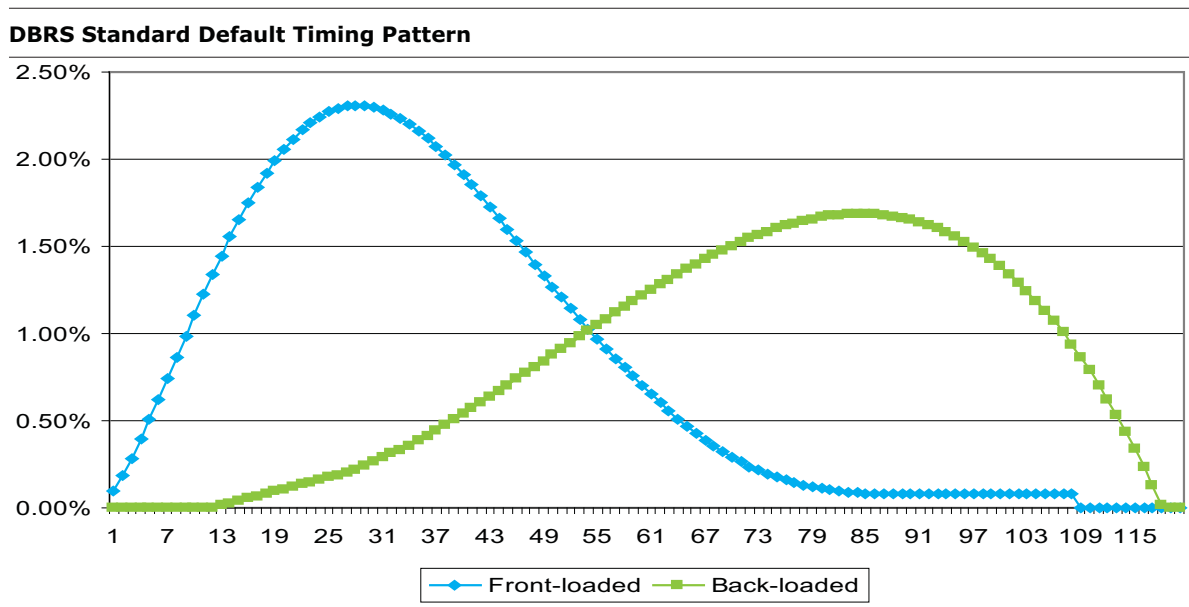
The current low prepayment environment presents a challenge in stressing RMBS transactions as slow speeds could lead to overly optimistic valuations of excess spread. Conversely, high prepayment speeds stress excess spread properly, but may also deplete collateral too quickly to allow 100% of the expected losses to pass through the capital structure. As such, DBRS finds it prudent to apply a dynamic prepayment stress.

In a typical transaction today, DBRS applies three prepayment stresses (slow, middle and fast) that range from 5% to 20% CPR. As expected, these speeds are adjusted upward or expanded should the overall prepayment environment change. The stresses are also validated against issuers’ actual prepayment experience for each type of transaction and within each jurisdiction.

TIMING OF DEFAULTS AND RECOVERIES

The timing of defaults is a key factor in evaluating excess spread. A defaulted loan obviously will not generate any principal and interest payments, thus depressing the amount of available excess spread. DBRS estimates two default timing patterns: front- and back-loaded default curves, as shown in the graph below. These curves illustrate how defaults will be distributed throughout the life of a transaction. The area under each curve adds up to 100%.

Because the servicers do not advance cash for mortgages in arrears, any principal and interest payments will be shut off as soon as a loan becomes delinquent. Under the DBRS stress, once the cash is shut off, any recoveries or liquidation proceeds will not be available for an extended period of time. The length of this period is dependent on the foreclosure and liquidation timeline within each jurisdiction and varies by transaction.





INTEREST RATE MISMATCH

Interest rate mismatch risk occurs when the interest rate on the underlying mortgage collateral adjusts differently from the interest coupon on the bonds. For example, assume that the underlying mortgage loans are either fixed-rate or fixed rate (short-term),⁴ and the bonds are based on EURIBOR, if EURIBOR rises, excess spread decreases. Interest rate mismatch also exists for securitisations in which the mortgage loans and bonds adjust from different indices. If the two indices were to converge, excess spread would decrease. It is important to quantify the effect of this mismatch by stressing interest rates.

DBRS generally applies three sets of interest rate stresses (upward, flat and downward) for each transaction. In a low interest rate environment, flat and downward stresses may be combined into one. Please refer to the Unified Interest Rate Model for more detail of the interest rate stresses applied by DBRS.

When stressing interest rates in some European RMBS transactions, DBRS often notices that under a few extremely conservative stress scenarios, namely high interest rate stresses coupled with a front-loaded default timing pattern, the rated bonds tend to come under a significant amount of pressure. In such scenarios, front-loaded defaults shut off a considerable amount of interest payments from the mortgage assets, causing an interest shortfall to the bonds.

When this happens, principal cash, which otherwise would have been used to amortise the bond balances, will likely be “borrowed” to cover these interest shortfalls, thus prolonging the paydown of the rated bonds. The more principal cash used to cover interest shortfalls, the longer it takes to retire the rated notes. Under such scenarios, an increased amount of credit support will be needed to account for the “borrowed” principal, resulting in higher credit enhancements than what the expected losses are for the pool at each rating category.

Conclusion

The DBRS Master European Residential Mortgage-Backed Securities Methodology sets forth the analytical framework for the DBRS credit analysis of European RMBS. This model is the quantitative tool that DBRS uses to assess the credit quality of European mortgage loans and produce standardised cash flow rep lines. DBRS expects to publish jurisdiction-specific addenda to this master methodology that detail the factors and multipliers of each of the PD and LGD drivers.

4. Fixed rate (short-term) pays a fixed-rate coupon for a short-term (commonly between two and five years), then switch to a variable rate for the remaining years until the maturity date.

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