

Methodology
U.S. RMBS Surveillance

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Insight beyond the rating.

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Related Research:

RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology
Legal Criteria for U.S. Structured Finance Transactions
Operational Risk Assessment for U.S. RMBS Servicers
Unified Interest Rate Model for U.S. RMBS Transactions

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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.



RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology

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Introduction

The purpose of this report is to provide a description of the DBRS U.S. Residential Mortgage-Backed Securities (RMBS)¹ surveillance process. The primary changes from the last published U.S. RMBS Surveillance Methodology are as follows:

- DBRS uses its proprietary RMBS Insight model (see “*RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology*” on www.dbrs.com) to monitor transaction performance to the extent updated loan-level data is available².
- In the RMBS Insight analysis, loan-level expected losses are typically aggregated to group-level not transaction-level. DBRS subsequently feeds the expected losses to the corresponding Intex groups to perform cash flow analysis on a group level.
- The loan-level RMBS Insight model incorporates the following key enhancements from the pre-crisis period:
 1. MSA-level home price forecast to estimate owner’s equity in the property, property value at liquidation, and market value declines by rating category.
 2. Consideration of regional economic data such as unemployment rate, house price index, growth rate in civilian labor force and per-capita income on a MSA level.
 3. Concentration risk in geography and loan size.
 4. Small pool penalties.
 5. Asset correlation and simulation approach to stress rating categories.
- In order to develop a more dynamic picture of performance, DBRS has incorporated a dynamic cash flow analysis with 40 scenarios encompassing fast and slow prepayment speeds, front- and back-loaded loss distributions as well as upward and downward interest rate stresses in its surveillance process.

Once DBRS assigns a final rating to an RMBS or Re-REMIC security, the surveillance process begins and is continued for as long as DBRS maintains a rating on the security. DBRS monitors all of its outstanding public, Rule 144A and private ratings to ensure each rating reflects all data and information sourced and received by DBRS. In general terms, ratings are opinions that reflect the creditworthiness of an issuer, a security, or an obligation.

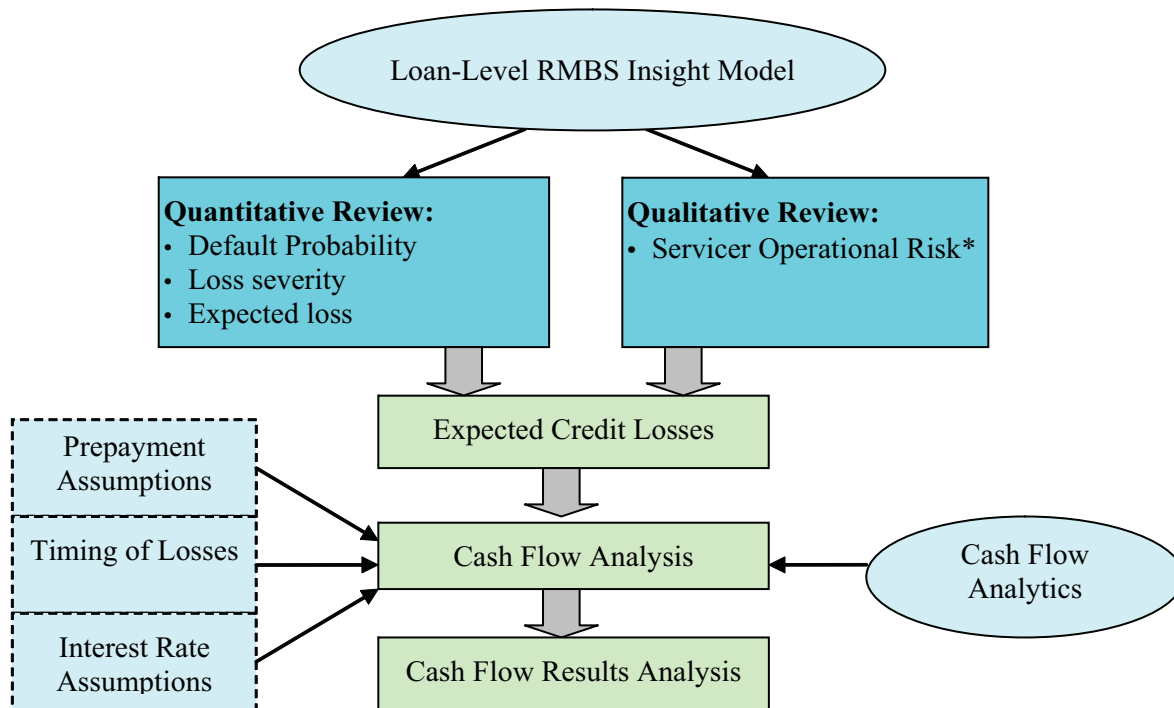
1. Includes RMBS and re-securitizations of real estate mortgage investment conduits (ReREMICs) transactions, Federal Housing Administration (FHA) and Veterans Affairs (VA) securitizations and (interest rate) swap termination payments.
2. DBRS uses MBSData LLC (“MBSData”) as its primary loan-level data source, complemented by Intex Solutions (“Intex”). A relatively small percentage of DBRS-rated transactions do not have updated loan-level information. Those transactions are monitored using a shadow pool approach, which is explained in Appendix 1 to this methodology.

Surveillance Review Process Overview

SURVEILLANCE PROCESS

DBRS utilizes the following process in reviewing RMBS transactions (as also illustrated in the diagram below):

- Derivation of expected losses.
- Utilization of cash flow modeling.
- Analysis of cash flow results.



* The qualitative review is generally applicable to newly-originated loans (less than two years seasoned). For seasoned loans, operational risk has usually manifested in deal performance over time, and is therefore captured through the seasoned characteristics by RMBS Insight.

Each rating is reviewed by a rating committee at least annually, either on or before the anniversary of its last committee or sooner if a periodic review indicates a rating action may be warranted. DBRS performs these periodic reviews to allow for the consideration of performance trends and to help identify and reduce the effects of performance anomalies that could lead to unnecessary rating volatility.

DBRS calculates expected losses and performs cash flow analysis on a periodic basis. If the analysis suggests that a rating change may be in order³, a rating committee is convened to review and discuss the analysis. The rating committee reviews transaction performance including both bond and collateral information. The rating also incorporates a review of relevant transaction parties and counterparties as warranted.

RATING COMMITTEES

All DBRS ratings and rating actions are determined by rating committees. The purpose of DBRS rating committees is as follows:

3. DBRS allows reasonably small fluctuations in its expected loss and cash flow analysis. With consideration for performance trends, if the results are within an acceptable threshold, the bond will not be brought to a rating committee for further review.



1. To provide objective and independent rating decisions that are a reflection of DBRS opinion, rather than the view of an individual analyst or analysts;
2. To ensure rating decisions are based on sufficient information, incorporate both global and local considerations, and apply DBRS approved methodologies;
3. To provide a checkpoint for actual and perceived conflicts of interest among analysts; and standardize the rules, procedures and documentation processes to drive efficiency and adherence with respect to rating decisions.

Rating committees have specific member composition requirements and are comprised of experienced and knowledgeable DBRS analysts, senior staff and management personnel. For monitoring existing securities, rating committees review each outstanding rating once per year, on or before the anniversary of the transaction's previous appearance before a rating committee or on an "as needed" basis when rating events occur. This approach provides maximum flexibility, as well as permitting timely and informative rating decisions.

RATING ACTIONS

Over the life of each rated security, DBRS may change a rating by raising (upgrade), lowering (downgrade), keeping the rating the same (confirm) or ceasing monitoring of a rating (discontinue). Other rating actions include placing a rating "Under Review". When a material event occurs that may directly impact the credit quality of a particular security, DBRS attempts to provide an immediate rating opinion. If there is uncertainty regarding the outcome of the event, and DBRS is unable to provide an objective, forward-looking opinion in a timely fashion, the rating(s) of the transaction(s) are placed Under Review.

When a decision is made by DBRS to place a rating Under Review, DBRS provides initial guidance as to its opinion by noting whether the Under Review action has Positive, Negative or Developing Implications. These descriptors indicate DBRS preliminary view of the impact on the credit quality of the security. As situations and potential rating implications may vary, a final rating conclusion may depart from the preliminary assessment. Typically, the subsequent rating action for securities placed Under Review with Positive Implications is either an upgrade or a confirmation. The subsequent rating action for securities placed Under Review with Negative Implications is typically either a downgrade or confirmation. The subsequent rating action for securities placed Under Review with Developing Implications may be an upgrade, downgrade or confirmation. A Developing description is typically used when a structured finance security is highly dependent on a corporate entity that has been placed Under Review with Developing Implications.

In cases where a rating is placed Under Review, DBRS views this as a temporary situation and strives to complete its review and remove the rating from this status as soon as it is appropriate to do so. In the event that a lengthy Under Review period is anticipated, DBRS may provide such guidance in a press release and may, if appropriate, provide guidance as to the anticipated rating that would emerge under a proposed scenario. In the event that DBRS decides to discontinue a rating that is Under Review, DBRS resolves the Under Review status prior to the discontinuance.

RATINGS

DBRS employs different rating scales for short term debt and long term debt.

Short term debt is rated on a scale ranging from R1 (high), which is the highest rating, to D which is the rating for a defaulted security. Rating categories between R1 and D are denoted as R2 through R5. The two highest rating categories, R1 and R2, have subcategories of "high" and "low", indicating a securities credit profile is at near the top or bottom of the range. A security in the R1 or R2 category with no designation of high or low means the rating is in the middle of the range.

The DBRS long-term debt rating scale ranges from "AAA" to "D" and with the exception of the "AAA" and "D" categories is denoted by the subcategories "high" and "low". The absence of either a "high" or



“low” designation indicates the rating is in the “middle” of the category. Below is a summary of the long term debt ratings scale. Please refer to dbrs.com Rating Scales for a description.

- AAA Highest quality
- AA Superior quality
- A Good quality
- BBB Adequate quality
- BB Speculative
- B Highly Speculative
- CCC/CC/C Very Highly Speculative
- D Defaulted

DISCLOSURE – PRESS RELEASES

DBRS typically discloses rating actions made on public and rule 144a transactions through the publication of press releases with the goal of delivering high quality rating opinions in a timely manner to the market. Press releases contain the name of the issuer, the rating action taken, the final rating determined and the title(s) of the relevant methodology(ies) applied.

DBRS may publish a Performance Analytics Report (PAR) for public and 144a RMBS deals on www.dbrs.com. The PAR provides a summary of the transaction’s performance in a user-friendly format to enable market participants to assess ongoing performance.

RMBS Surveillance Methodology

SUMMARY

In an effort to stay consistent with the U.S. RMBS rating methodology, DBRS employs the same RMBS Insight model to monitor transactions to the extent updated loan-level data is available. DBRS uses MBSData as its primary loan-level data source, complemented by Intex.

The loan-level RMBS Insight Model consists of multiple sub-modules that cover a variety of asset types that include standard RMBS and ReREMIC transactions, Federal Housing Administration (FHA) and Veterans Affairs (VA) securitizations and (interest rate) swap termination payments.

In the following sections, DBRS summarizes the key components⁴ of its loan-level probability of default and loss severity analysis in RMBS Insight. A more detailed description of the RMBS Insight model can be found in “*RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology*” on www.dbrs.com.

LOAN-LEVEL PROBABILITY OF DEFAULT

Default Considerations

DBRS analyzes mortgage probability of default by examining the following components:

1. Borrower characteristics and credit risk.
2. Mortgage loan characteristics.
3. Mortgaged property characteristics.
4. Regional economic characteristics: both in the past and forward-looking.

4. Not every aspect of the loan-level RMBS Insight model is described in this document. Only the key components are listed here. Please refer to *RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology* for details.



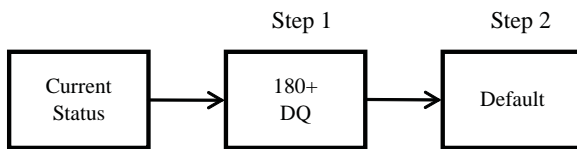
If a loan is seasoned (aged six months or more), then *additional* characteristics are considered:

5. Current pay status (delinquency, bankruptcy, foreclosure).
6. Payment history.
7. Loan modifications.
8. Payment shock.
9. Loan Age.

Conceptual Default Process

A conceptual map of the default process, as shown as Figure 1, is used to inform the model structure.

Figure 1. Conceptual Default Process



This is a simplified figure that views default as a two-step process. The first step in the process occurs when a loan moves from current to 180 days delinquent. The second step happens when a loan moves into default. Default in this context means “charged off” and removed from the transaction. At default, the loss severity is known and final losses are determined. A seasoned loan drops into the process based on its current status. For example, a loan that is 210 days delinquent starts at the second step in Figure 1.

Derivation of Life-Time Default Rate – The Delinquency Score Model and Tail Model

Two models combine to produce the monthly, conditional 180-day delinquency rate. The two models are:

1. The 2-Year D180 Rate Model (referred to as the Delinquency Score): This model estimates the probability a loan becomes 180 days delinquent in the first two years of the forecast.
2. The tail model: This model estimates, month by month, the 180-day delinquency rate for months 25 and on.

Delinquency Score

The Delinquency Score, or the 2-Year D180 Rate Model, is similar in spirit to the kinds of scores one sees in consumer credit. The Delinquency Score is a series of statistical models that are built on loan-level data. These models forecast the probability of a loan becoming 180 days delinquent in the first two years (after the as-of date) based on a list of explanatory variables.

The Delinquency Score consists of six separate models. The segmentation used is:

Forecast: Loan Origination

1. First-lien fixed-rate loans.
2. First-lien ARM loans.
3. Second-lien closed-end loans.

Forecast: Seasoned Loan

4. The loan is not delinquent.
5. The loan is 30-60 days delinquent.
6. The loan is 90-150 days delinquent.

The Tail Model

Once the probability of a loan becoming 180 days delinquent in the first two years of the forecast has been estimated, this must be projected into a life-of-loan value. The tail model is a key component of that calculation.



The tail model takes the following inputs:

1. The delinquency score.
2. The age of the loan at the start of the forecast.
3. The age of the loan month by month.

The output of the tail model is a month-by-month conditional probability that the loan becomes 180 days delinquent.

LOAN-LEVEL LOSS SEVERITY

Loss severity is calculated as follows:

1. A recovery value is estimated from the statistical recovery model.
2. Interest advancing (if desired) is subtracted from the recovery.
3. Loss is calculated as the shortfall of recovery to loan balance outstanding.

In order to derive a recovery value, DBRS first estimates an updated property value at liquidation, which includes the following considerations:

1. MSA-level property value indexing using Case-Schiller data to update value from issuance.
2. MSA-level home price forecast using DBRS peak-to-trough home price forecast model.
3. Market value decline stress by rating category.
4. Distressed sale discount.
5. Further adjustment based on borrower and property characteristics.

For loans with mortgage insurance, the insurance coverage amount is added back to the recovery value subject to a haircut. For FHA and VA securitizations, insurance coverage is analyzed in a similar way. DBRS calculates the losses not reimbursed by the Housing and Urban Development (HUD) or the Department of Veteran Affairs, and stresses such amount for each of the rating categories.

SHRINKAGE, CONCENTRATION RISK AND SMALL POOLS

Shrinkage Factor (or Deal Adjustment)

Historically, “good” loans (loans with good collateral attributes) in a subprime pool tended to perform worse than if the same loans were included in a prime pool. The worse performance is suspected to at least be partially driven by the assignment process (of these loans into a subprime pool) which may be a reflection of looser underwriting standards. The opposite is also true. When a “bad” loan showed up in a prime pool, it tended to exhibit better performance than if it was included in a subprime pool. The loan may represent an “exception” to the underwriting process that underwent additional scrutiny.

Applying a shrinkage factor in transactions pulls each loan closer to the average. A “good” loan in a subprime deal may not deserve the credit it would otherwise have received. Conversely, a “bad” loan in a prime deal may not be as bad as its collateral attributes have suggested.

Concentration Risk in Loan Size and Geography

The risk presented by concentrations is that of an increased chance of loss exceeding the expected level rather than an increase in the expected level of loss. As such, the effect of concentration risk appears in the BB to AAA rating scenarios and not the B level estimates. Concentration is measured by a Herfindahl index calculated on both a geographic and loan-size basis. The level of asset correlation is determined by the levels of concentration and credit quality. The asset correlation is an important factor in the determination of rating levels.

Small Pools

For securitizations consisting of fewer than 300 loans, RMBS Insight incorporates a small pool adjustment. Small pools are typically more sensitive to certain large loans incurring losses and therefore may exhibit a risk in excess of the model estimate. Small pool adjustments vary by loan count and rating category.



RMBS pools tend to exhibit “tail” risk or adverse selection as mortgages prepay or amortize, thus creating increased performance volatility for small pools over time. Such volatility and the inherent credit risk are difficult to ascertain by rating models. These days, when call options are not exercised as frequently as before, DBRS may withdraw ratings when the underlying pools reduce to a very small size (for example approximately 50 loans or fewer).

RATING CATEGORY STRESS ALGORITHM

Rating category stress levels are predicated on models of joint loan behavior, both default and recovery. The parameters of these models are estimated from historical performance data. Working up from the loan-level produces results that are sensitive to the nature of the pool (or portfolio) being analyzed. The distributions of expected default, loan balance, and property location will all impact the rating stress levels. The stress levels themselves are determined so that the probability of exceeding the level is less than a target value, or confidence interval, as established by the DBRS published idealized default table.

Because of the complexity of the relationships, a simulation approach is taken to determining the portfolio-level distributions of default and recovery. The simulation approach enables the resulting stress levels to fully realize the dependencies that have been modeled.

CASH FLOW ANALYSIS

Baseline Cash Flow Analysis

Once the expected losses are derived, for transactions that may be impacted by cash flow stresses, DBRS undertakes a detailed structural 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 following risk factors:

1. Prepayment speeds
2. Timing of losses
3. Interest rate stresses (when there is a mismatch between the collateral and bond coupons)

The complexity of the capital structures in RMBS transactions requires testing various combinations of cash flow stresses to properly analyze a bond. DBRS incorporates a dynamic cash flow analysis in our rating process. As indicated in Table 1 below, a baseline of five prepayment scenarios (under two Intex conventions – Standard and Max⁵), two loss timing curves and two interest rate stresses are generally applied 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. As warranted, transactions may be further stressed to include weighted average coupon (WAC) deterioration. DBRS generally runs 40 scenarios in each rating category to test the sensitivity of the rated securities to various cash flow stresses.

5. Standard: The standard prepayment rate consists of voluntary prepayments only. Prepayment amount and default amount are applied to the loans independently. Max: Intex will first apply the defaulted amount, then apply the prepayment amount such that the total amount applied is equal to the larger of the prepayment or the default amount.



Table 1: DBRS Base Cash Flow Scenarios

Scenario	Prepayments	Intex Prepayment		Interest Rate*
		Convention	Loss Timing	
1-5	5 - 25% CPR	Standard	Front-loaded	Upward
6-10	5 - 25% CPR	Standard	Front-loaded	Downward
11-15	5 - 25% CPR	Standard	Back-loaded	Upward
16-20	5 - 25% CPR	Standard	Back-loaded	Downward
21-25	5 - 25% CPR	Max	Front-loaded	Upward
26-30	5 - 25% CPR	Max	Front-loaded	Downward
31-35	5 - 25% CPR	Max	Back-loaded	Upward
36-40	5 - 25% CPR	Max	Back-loaded	Downward

*Where there is a mismatch between the collateral and bond coupons. Please refer to the Unified Interest Rate Model for U.S. RMBS Transactions for more detail of the interest rate stresses applied by DBRS.

Enhanced Cash Flow Analysis

Cash flow assumptions for liquidating trust securitizations and swap termination payments vary slightly due to the nature of their underlying mortgages. Cash flow for liquidating trusts, backed by mostly non-performing assets, focuses on the expected timing of liquidation proceeds for each delinquency bucket and such loss timing curves are intentionally back-loaded. Given the mostly delinquent underlying assets, DBRS also assumes 0% prepayment speed on liquidating trust transactions. For swap termination payments, DBRS stresses various cash flow assumptions to capture the minimum amount of collateral cash flow (on the asset side) and the maximum amount of the swap termination payments (on the liability side).

For transactions without servicing advances, DBRS typically terminates any cash flow from a loan as soon as it becomes delinquent. The recovery proceeds do not begin until such loan is liquidated, generally 24 to 30 months later. Sometimes such transactions maintain strictly separate interest and principal payment streams, and have capped the coupon of the rated class at the actual interest received. In such instances, DBRS may modify the cashflow assumptions for these types of transactions.

In the rare instance where cash flows are unavailable for the transaction, an alternative method may be utilized to assess whether the credit enhancement available is sufficient to sustain the projected losses in a given rating category. In the event that there is insufficient information for the analysis, DBRS may discontinue the rating.

Trigger Analysis

In a transaction with performance triggers, principal payments can switch between sequential and pro-rata distribution among the senior and the subordinate notes based on collateral performance. When analyzing cash flows, DBRS approximates a delinquency vector to test the impact of delinquency triggers.

SERVICING PRACTICES AND IMPACT TO REREMICS INTEREST PAYMENTS

Since a ReREMIC is a pass-through of interest, principal and losses from the underlying certificates, its interest entitlement is usually capped at the actual interest amount collected on the underlying securities. In other words, a ReREMIC trust can not pay out more interest than it receives from its collateral, and sometimes, what is collected on the underlying securities can be as low as zero.

When rating ReREMICs, DBRS is assessing the ability of the trust to make the full principal payment by the legal final maturity date of the transaction. These transactions typically define the interest rate as the lesser of the bond coupon and the available interest funds. Hence, the DBRS rating does not provide



an opinion on the timeliness or amount of interest payments the investor may receive. The trust's only obligation is to pass through the interest proceeds net of fees from the underlying securities.

Continued deterioration in securitization performance has prompted changes in servicing practices that were not anticipated from the pre-crisis period. Loan modification, mostly in the form of interest rate reduction, was a loss mitigation technique meant only for a limited number of distressed borrowers, not as a solution to colossal defaults as it is today. In addition, large scale modifications often allowed servicers to recoup past servicing advances at the top of the waterfall, reducing the interest amount distributable to the bond holders. Finally, driven by the unprecedented level of delinquent mortgages and extension of foreclosure timelines, a declining trend in servicing advances has been observed and will most likely continue in the foreseeable future. Consequently, ReREMIC investors these days are more likely to experience lower interest receipts for reasons described above.

All above concepts are detailed in the methodology titled "*RMBS Insight: U.S. Residential Mortgage-Backed Securities Loss Model and Rating Methodology*" on www.dbrs.com.

SURVEILLANCE ASSUMPTIONS

Macroeconomic conditions, prepayment speeds and liquidation timelines change with time and asset pools. RMBS Insight provides users with the option to forecast quantities of the variables listed below. When monitoring a transaction, these assumptions are generally based on actual observations and/or industry forecasts.

1. Future changes in unemployment rates – by default, DBRS assumes no changes from the most recently observed regional unemployment rate.
2. Future changes in house prices – by default, DBRS generally assumes no further stresses in house prices on top of its baseline peak-to-trough home price forecast and market value decline by rating category.
3. Voluntary prepayment rate (CPR) – by default, DBRS assumes a transaction's observed 12-month trailing CPR unless specified in this methodology⁶.
4. Future changes in liquidation timelines – by default, DBRS assumes no changes to the currently observed liquidation timeline.
5. Future changes in months in real estate-owned (REO) properties – by default, DBRS assumes 6 months.
6. Roll rates from 180 Days delinquency to default – by default, DBRS assumes 100% roll rate.

Many of the seasoned transactions represent lax underwriting processes, weak policies and controls and inflated appraisals. A portion of these risks are manifested in deal performance over time, and are therefore captured through the seasoned characteristics by RMBS Insight. Additional haircuts/stresses on original appraisals (on top of property value indexing using Case-Schiller data on a MSA-level) and mortgage insurance may be warranted to address these risks on seasoned loans.

In some transactions, either the entire deal or a specific bond may have an explicit guarantee from an entity such as a Bond Insurer, Guarantor, or Issuer. In these cases, the rating of the entity will be taken into consideration when assessing the transaction or bond.

In addition, a small percentage of DBRS-rated transactions may be missing certain loan-level fields. Where possible, DBRS has made reasonable and conservative assumptions to enable the RMBS Insight model to run. For example, missing original appraisals may be derived from the original loan-to-value ratios, or missing zip codes may be defaulted to the region of the state that has had the largest decline in house prices since the loan was originated. In the rare case that there is no loan-level information available, alternative procedures to project reasonable loss, default, and loss severity assumptions at each rating

6. For transactions backed by loans with fewer than 12 months of prepayment history, DBRS uses the assumed CPR at the time of assigning a rating.



category may be utilized. For those transactions where only loan-level origination tapes are available, DBRS may use the Shadow Pool Methodology outlined in Appendix 1. In cases where the information available is insufficient, DBRS may discontinue the rating.

ANALYSIS OF CASH FLOW RESULTS

In order to maintain the appropriate ratings on securities, DBRS reviews the cash flow results. The review encompasses a check for errors (for instance, scenarios did not run properly) and for reasonability. DBRS may apply certain qualitative factors to the analysis such as changes in servicer, loss mitigation efforts or performance trends that may not have been accounted for in a typical cash flow analysis. The rating committee may either accept or modify the rating recommendation⁷ if the committee decides that adjustments are necessary to improve the risk assessment.

7. A material deviation from the rating implied by the model would be a three-notch or greater rating difference.



Appendix 1: Shadow Pool Methodology

SUMMARY

The purpose of this appendix is to describe the methodology for determining expected losses for outstanding U.S. RMBS transactions when updated loan-level information is not available to DBRS from either MBSData or Intex.

A shadow pool approach based on a nearest neighbor methodology has been defined to handle the situation, in which loan-level origination data is available, but current performance data is only available on a pool level basis. The philosophy of constructing the shadow pool is to leverage the analytics provide by the RMBS Insight model and the comprehensive MBSData dataset.

METHODOLOGY

Since the subject pool (or the target pool) does not have updated loan-level data, a shadow pool is created from similar loans with matching characteristics as a proxy for the target pool. The construction of the shadow pool is described in detail below.

The methodology needs the following input data:

- Loan-level data at origination (or transaction inception) – target pool
 1. Product type.
 2. First payment date.
 3. Origination loan balance.
 4. Appraisal value.
 5. Property State and zip code.

- Pool-level data at the as-of-date (or date of review):
 1. Current pool balance.
 2. Percent of the balance that is: Current, 30 days, 60 days, 90+ days delinquent, foreclosure and REO.

Shadow Pool Construction

For each loan in the target pool, DBRS pulls similar loans (or “candidate” loans) from the MBSData database with matching characteristics. A distance metric is calculated to determine the “closeness” of each candidate loan to the target loan. Only the closest candidate loans are selected for each target loan.

For each target loan, DBRS then calculates the average delinquency of all selected candidate loans, a value called DQM. Each target loan has one DQM. The target pool is sorted by descending DQM, and as such, the target loans are arranged in the order from the most likely to default to the least likely to default.

Once the target loans are ordered, DBRS constructs a shadow pool by selecting the most relevant candidate loan for each target loan. The candidate loans are selected in the following sequence: REO, foreclosure, 90+ days delinquent, 60, 30 and current. For the first target loan in the pool (with the highest DQM), DBRS selects from its candidate loans an REO that has the lowest distance metric, i.e. the closest candidate to target loan #1 that is a REO. Another candidate REO closest to the second target loan is then chosen. One by one, the closest REO candidate for each target loan is selected until the necessary balance of REO is reached. Each target loan is removed from further consideration.

The selection process is then repeated, in turn, for the foreclosure, 90+ delinquent, 60, 30 and current buckets. The construction process is illustrated in Figure 2 below.



Figure 2. Shadow Pool Construction

Target Loan (Sorted by DQM)	Candidate Loan	DQM (Likelihood to default)	Candidate Loan Selected	Until
1	1, 2, 3.....300	Highest	A REO with the lowest distance metric to target loan #1	} REO balance reached
2	1, 2, 3.....300		A REO with the lowest distance metric to target loan #2	
3	1, 2, 3.....300		A REO with the lowest distance metric to target loan #3	
4	1, 2, 3.....300		A REO with the lowest distance metric to target loan #4	
5	1, 2, 3.....300		A REO with the lowest distance metric to target loan #5	
6	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #6	} FC balance reached
7	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #7	
8	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #8	
9	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #9	
10	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #10	
11	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #11	} 90+ balance reached
12	1, 2, 3.....300		A foreclosure loan with the lowest distance metric to target loan #12	
13	1, 2, 3.....300		A 90+ loan with the lowest distance metric to target loan #13	} 60+ balance reached
14	1, 2, 3.....300		A 90+ loan with the lowest distance metric to target loan #14	
...	} 30+ balance reached
100	1, 2, 3.....300		A 60+ loan with the lowest distance metric to target loan #100	
101	1, 2, 3.....300		A 60+ loan with the lowest distance metric to target loan #101	} 30+ balance reached
...	
300	1, 2, 3.....300		A 30+ loan with the lowest distance metric to target loan #300	} Current balance reached
301	1, 2, 3.....300		A 30+ loan with the lowest distance metric to target loan #301	
...	} Discard the rest of the target pool
500	1, 2, 3.....300		A current loan with the lowest distance metric to target loan #500	
501	1, 2, 3.....300		A current loan with the lowest distance metric to target loan #501	
...	...	Lowest	...	

This orders the dataset in such a way so that the ‘riskiest’ target loans tend to be used up first, leaving better loans for the better buckets which results in a more conservative process.

The loans in the shadow pool are then used as the collateral file for input to the loan-level RMBS Insight model. This process works well because the key variables in RMBS Insight for seasoned loans drive the construction of the shadow pool. Such key variables are: current delinquency status, current/future equity/LTV, product type, payment histories and FICO scores, DBRS designs the shadow pool to match the target population on all of these key variables.

Evaluation of the Shadow Pool Methodology

The method is evaluated by selecting deals from the MBSData dataset, creating a shadow pool and then comparing the forecasts for the shadow pool and the target pool.

The following types of transactions are identified from the MBSData dataset:

- Prime
- Alt-A
- Subprime
- Non-performing loans
- Option ARM
- Second lien

The deals are further filtered based on:

- Deals issued in 2004 and later.
- Sufficient data to employ RMBS Insight.

Target deals are randomly selected from each sort. None of the target pool loans are allowed to enter the shadow pool. As a starting point, DBRS looked at how well the shadow portfolio matches the target portfolio on both the origination characteristics and the current delinquency status. The match is exceptionally good.



Subsequently, DBRS ran both the target pools and the shadow pools to derive expected loss rates. The loss rates on the target pools and shadow pools correlate very well across the ratings spectrum. Table 2 and Table 3 below show the comparisons by rating category and by loan type.

Table 2. Average Loss Rate by Rating Category

Rating	Loss Rate Correlation	Avg Loss Rate	
		Target	Shadow
AAA	97.0%	77.3%	78.0%
AA	96.9%	72.5%	73.1%
A	96.9%	67.6%	68.1%
BBB	96.9%	62.5%	63.0%
BB	96.8%	56.9%	57.4%
B	96.4%	50.9%	51.5%

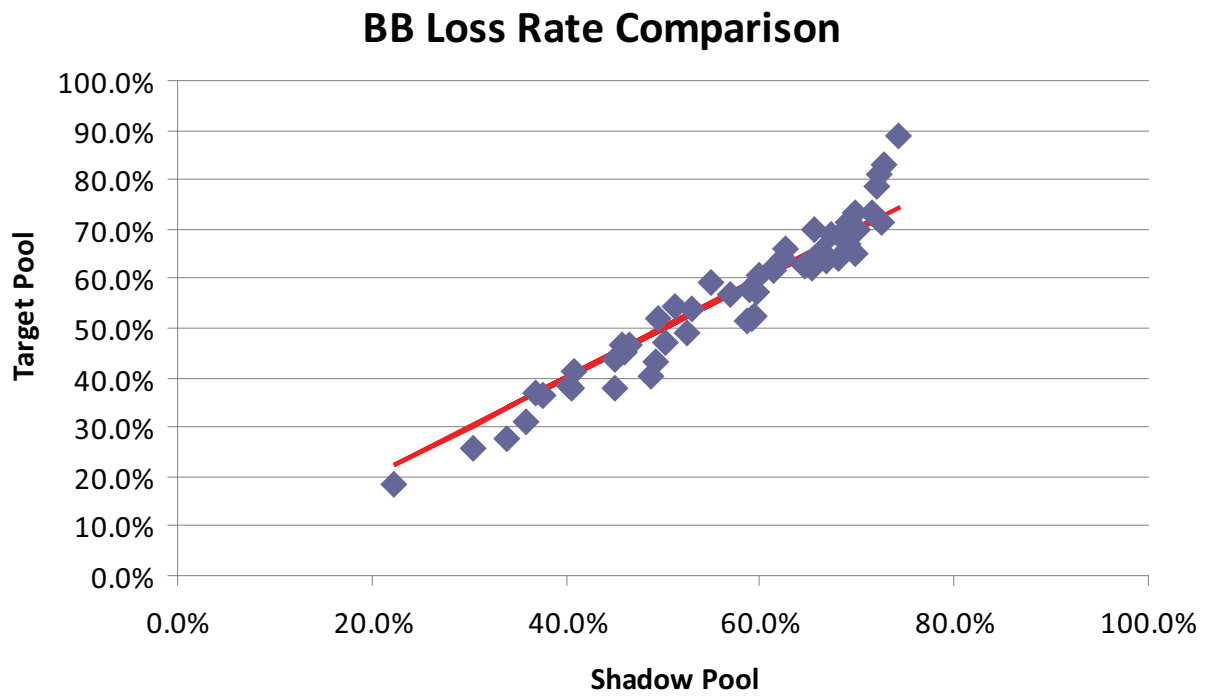
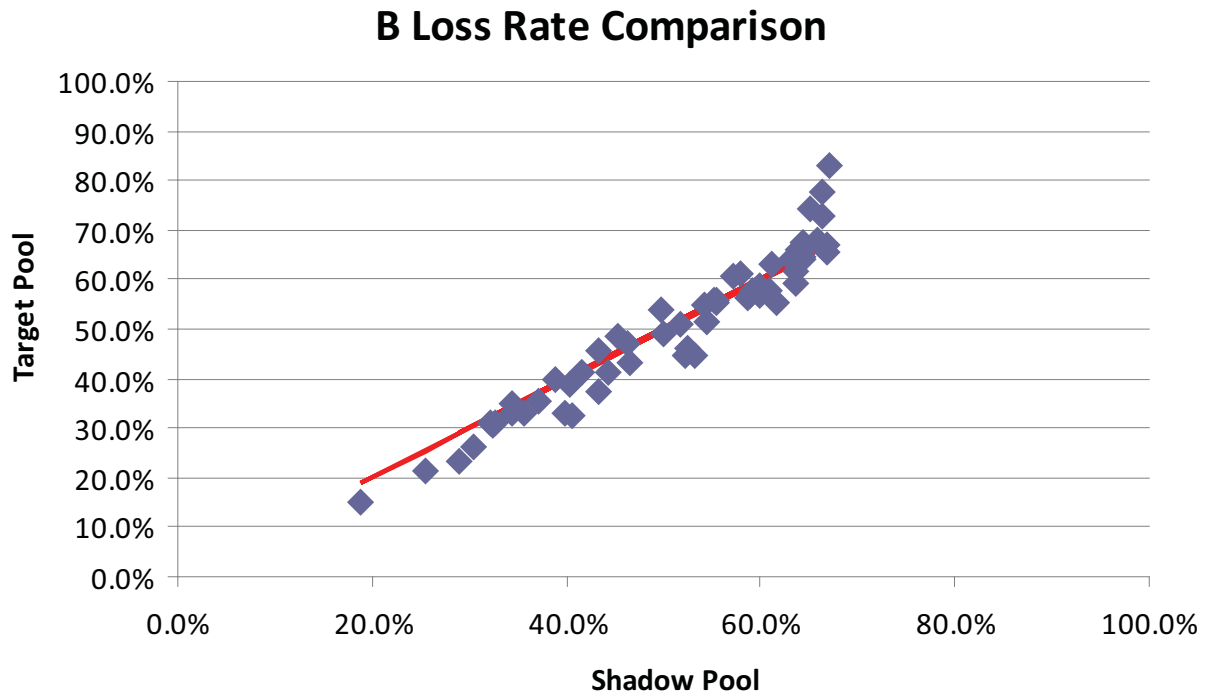
Table 3. Average Loss Rate by Loan Type

Loan Type	Average Loss Rate			
	B		AAA	
	Target	Shadow	Target	Shadow
Prime	31%	35%	56%	60%
Alt-A	50%	50%	76%	76%
Subprime	60%	59%	86%	86%
NPL	60%	61%	86%	87%
Option ARM	56%	57%	81%	82%
Seconds	55%	54%	84%	81%
Total	50%	52%	76%	77%

Figure 3 on the next page exhibits loss rates comparisons between the target and the shadow pools for each of the selected transactions. The more pronounced deviations are from second lien transactions with expected loss rates exceeding 60%.

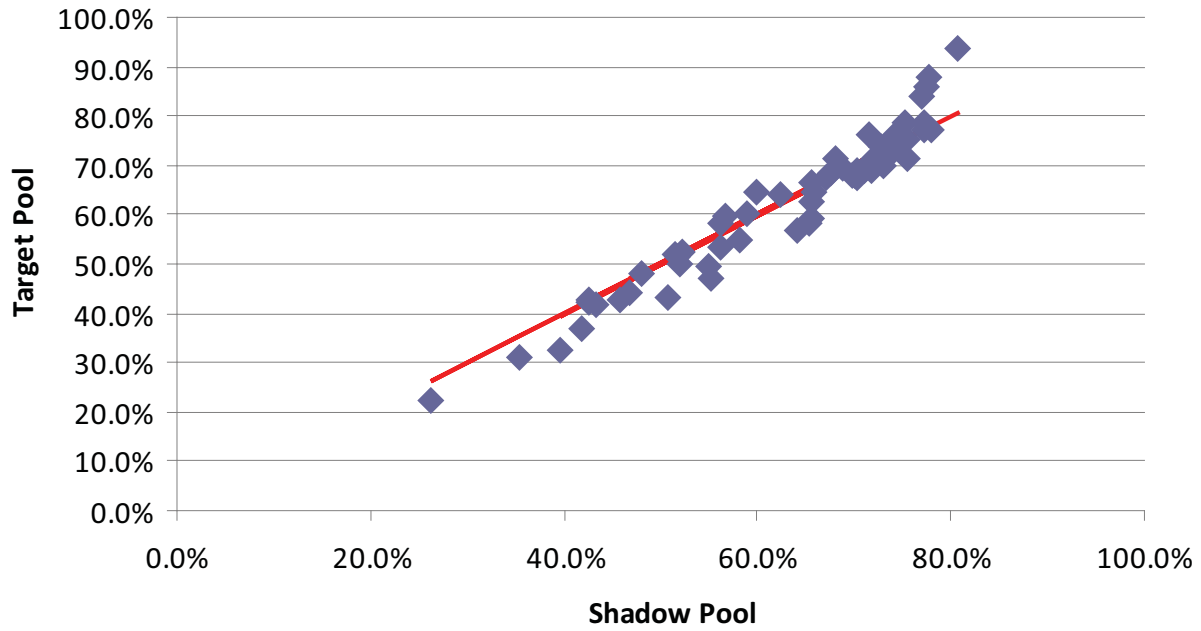


Figure 3. Loss Rates Comparison

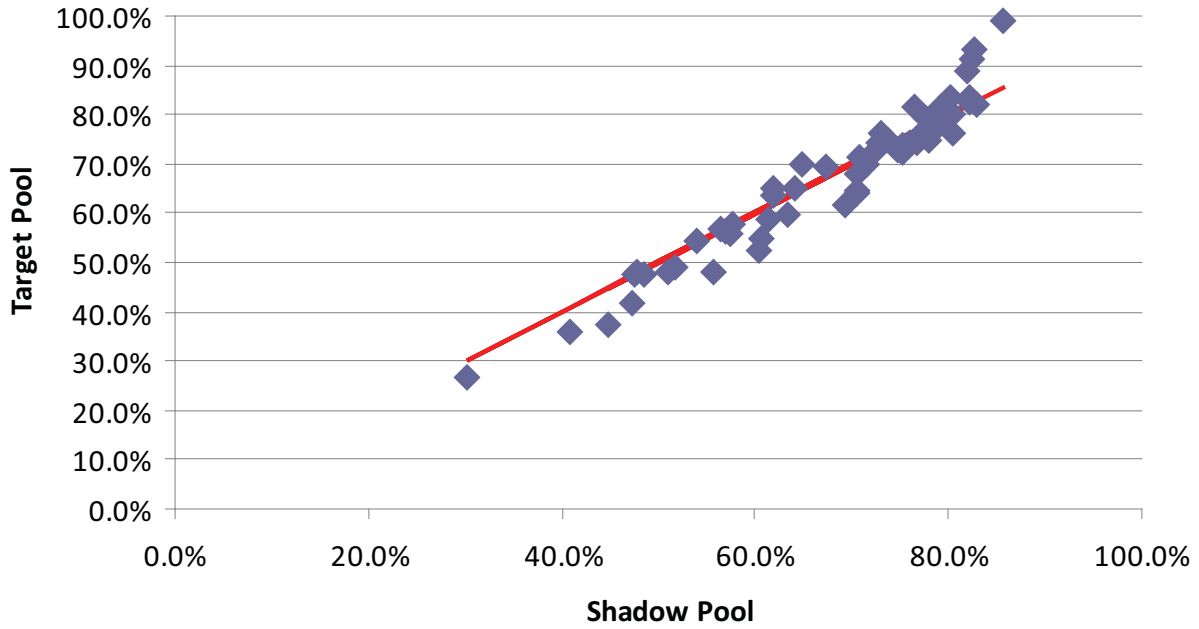




BBB Loss Rate Comparison

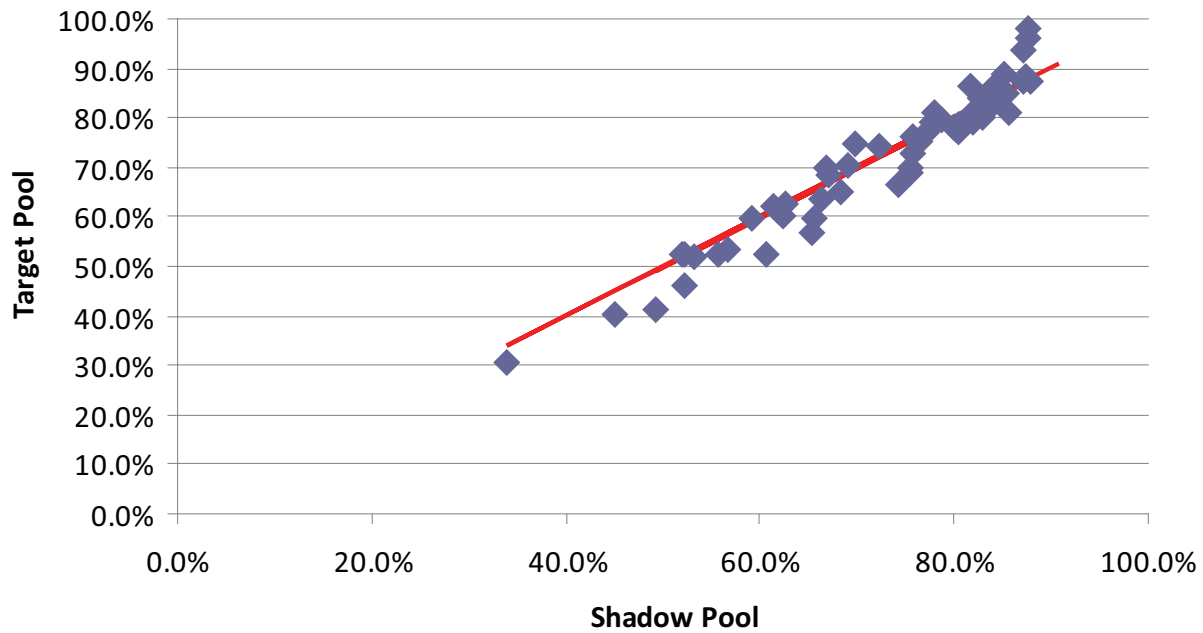


A Loss Rate Comparison

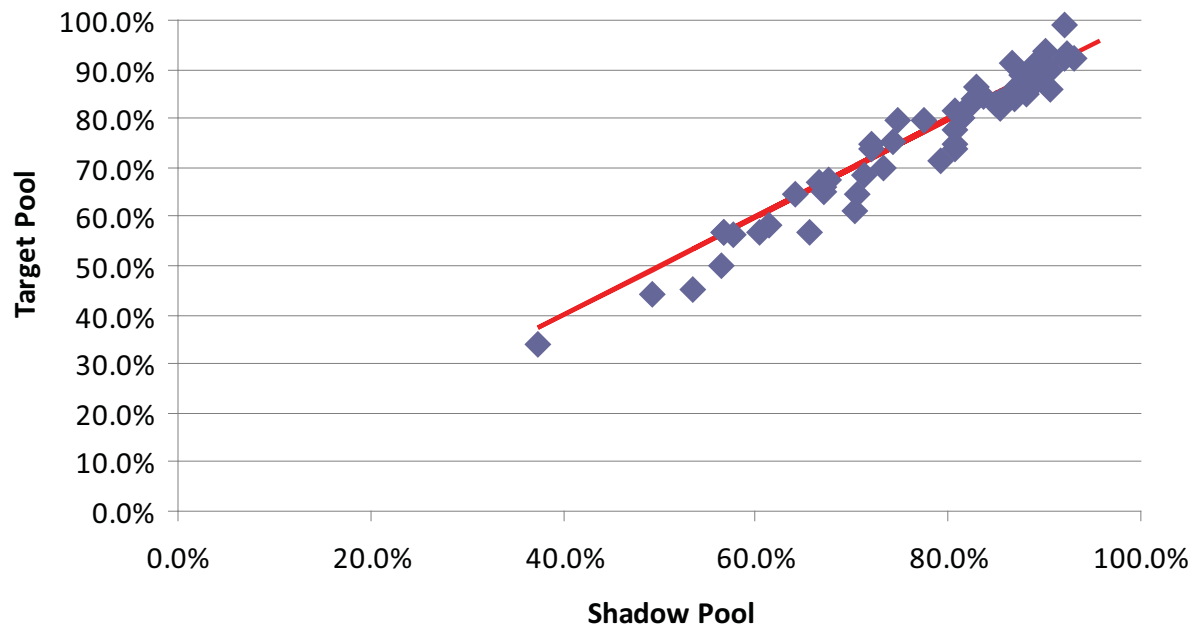




AA Loss Rate Comparison



AAA Loss Rate Comparison



Conclusion

The evaluation indicates that second liens show slightly more volatility between the target and shadow pools. To address this, DBRS applies a factor of 1.1 to all second lien deals (if the shadow pool methodology is used) with base case expected losses over 60%.

Overall the shadow pool methodology works very well on mortgages across all segments examined. It also allows DBRS to leverage the analytics provide by the RMBS Insight model and the comprehensive MBSData dataset.

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