European RMBS Insight: Dutch Addendum

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Related Research

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Key Updates

For key updates to this methodology please refer to the press release titled "DBRS Publishes Updated Dutch Addendum to the European RMBS Insight Methodology" dated 5 March 2018.

Scope and Limitations

DBRS evaluates both qualitative and quantitative factors when assigning ratings to Dutch residential mortgage-backed securities (RMBS) transactions. This methodology represents DBRS's approach to rating Dutch RMBS transactions with residential mortgage loans originated in the Netherlands. It describes DBRS's approach to its loan-level data analysis to calculate the expected credit losses on a residential mortgage portfolio and cash flow analysis. This report also outlines the asset class and discusses the model and methods DBRS typically employs when assessing a transaction and assigning a rating(s). It is important to note that the methods described herein may not be applicable in all cases. Further, this methodology is meant to provide guidance regarding the DBRS methods used in the sector and should not be interpreted with formulaic inflexibility, but understood in the context of the dynamic environment in which it is intended to be applied.

Executive Summary

This report is the Dutch Addendum to DBRS's *European RMBS Insight Methodology* (the Methodology). The report outlines the country-specific aspects of the Methodology to estimate defaults and losses for Dutch RMBS and Covered Bonds. This addendum should be read in parallel with the Methodology. The addendum includes an overview of:

1. Data used for building the Dutch Loan Scoring Approach and Dutch Delinquency Migration Matrices,

2. Dutch Loan Scoring Approach (Dutch LSA),

3. Dutch Dynamic Delinquency Migration Matrices (Dutch DMM),

4. Dutch Correlation Assumption,

5. Dutch House Prices,

6. Dutch Distressed Sale Discount,

7. Dutch Foreclosure Costs,

8. Dutch CPR Assumptions, and

9. Dutch Cash Flow Assumptions.

Data

The Dutch LSA and the Dutch DMM were constructed using loan-level data from the European DataWarehouse (EDW). Distressed Sale Discounts and rescission rates were calculated using repossession data and Nationale Hypotheek Garantie (NHG) pay out data, respectively, provided by Dutch issuers or, if available, obtained from the EDW.

House price data from Statistics Netherlands (CBS) was used to generate a base house price forecast and market value declines (MVDs). Additionally, the monthly Dutch Harmonised Consumer Price Index (CPI) from Eurostat was used to calculate real house prices.

Dutch Loan Scoring Approach

Dutch LSA Sample

In the first stage of the portfolio defaults and portfolio losses estimation for Dutch mortgages, loans[1] are scored dynamically over a forecast horizon in the Dutch LSA. The technology used to build the Dutch LSA is logistic regression. To build a score in this framework, a loan's risk characteristics at a point in time (the as-of date) and a binary outcome variable that represents the loan's performance over a period of time subsequent to the as-of date must be known.

A set of data-cleaning rules was applied to the Dutch loans in the EDW to identify a dataset to develop the Dutch LSA. The dataset included loans with the following characteristics:

• For each reporting date, there is a 12-month performance window of data available subsequent to that reporting date;

• The account is current at the as-of date;

• The current balance is greater than EUR 1,000; and

• The current interest rate is between 0% and 20%.

Given the universe of loans, the data on each loan is assembled with the risk characteristics at the as-of date and the binary outcome variable ("good loan" vs "bad loan") assigned based on its observed performance over the subsequent 12 months from the as-of date. A loan is considered a "bad loan" if, during the 12-month period, it either (1) entered into 90+ days arrears, (2) was foreclosed, (3) was repurchased from a delinquency status of two months or more or (4) was prepaid from a delinquency status of two months or more. Otherwise, it is considered a "good loan".

Loans with multiple as-of dates were subject to entering the reference sample only once. Bad loans did not represent a very high proportion and, as a result, were oversampled to increase their presence in the reference sample. The reference sample for the Dutch LSA included approximately 90,000 loans, of which 17,000 were considered "bad loans" and 73,000 were considered to be "good loans".

Dutch LSA Parameters

The Dutch LSA was built with objective variables (loan and borrower characteristics) and judgmental variables (Dutch Underwriting Score and Deal Quality). The Dutch LSA consists of 29 parameters from 16 variables (Exhibit 1). Exhibit 1 also reports the odds ratio for each parameter. The odds ratio measures the effect of each parameter in the Dutch LSA.

Exhibit 1 – Dutch LSA Parameters

Parameter	Odds Ratio	Variable Change	Variable Type
Indexed LTV			
1%-50%	1.20	40% – 50%	Continuous
50%-85%	1.13	75% – 85%	Continuous
85%-100%	1.23	90% – 100%	Continuous
100%-125%	1.17	115% – 125%	Continuous
Interest Rate Reset Interval			
0-36 months	1.12	24 months – 36 months	Continuous
36-120 months	0.88	108 months – 120 months	Continuous
120-180 months	0.93	168 months – 180 months	Continuous
180-240 months	0.97	228 months – 240 months	Continuous
Current LTI Ratio			
2.5x-3.8x	1.06	3.3x – 3.8x	Continuous
3.7x-4.5x	1.20	4.0x – 4.5x	Continuous
4.5x-5.5x	1.09	5.0x – 5.5x	Continuous

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1. Dutch borrowers typically have multiple loan parts on a property. A set of aggregation rules for a single borrower over each property is applied for the construction of the Dutch LSA. The same rules are applied to loans in a portfolio when analysing Dutch mortgages with the DBRS European RMBS Insight Model. As a result of this aggregation, every borrower has one score per property based on the consolidated loan.

Exhibit 1 – Dutch LSA Parameters

Parameter	Odds Ratio	Variable Change	Variable Type
Interest Rate Margin			
2.0%-4.5%	1.04	2.5% – 3%	Continuous
4.5%-6.0%	1.18	5% – 5.5%	Continuous
Loan Seasoning 60-120 months	0.94	72 months – 84 months	Continuous
Property type - house/flat/terraced house	0.62		Binary
Self-Employed or Unspecified	1.60		Binary
NHG Guarantee	0.76		Binary
No income reported	1.50		Binary
Multiple loan parts	1.16		Binary
Repayment Loans	1.43		Binary
Life insurance mortgage	1.46		Binary
Equity Release/Debt Consolidation	2.43		Binary
Floating Rate Loan	0.61		Binary
Dutch Underwriting Score			
High	0.60		Binary
Medium	1.00		Binary
Low	1.63		Binary
Dutch Portfolio Benchmarking			
Good	0.79		Binary
Moderate	1.00		Binary
Bad	1.49		Binary

Given the nature of the scoring approach, the most direct way to measure the effect of a variable is by examining the odds ratio. Take, for example, the binary variable Self-Employed. The odds ratio comparing Self-Employed to non-Self-Employed is:

$$\textbf{(P[Self-Employed]/(1-P[Self-Employed])) / (P[non-Self-Employed]/(1-P[non-Self-Employed]))}$$

Here, P[Self-Employed] is the probability of a loan to a self-employed borrower becoming bad in the 12-month time horizon. For logistic regression, the odds ratio constructed on the values of one explanatory variable does not depend on the values of any of the other explanatory variables. Variables included in the Dutch LSA are either binary, where the loan includes the relevant parameter or does not, or continuous, where the odds ratio represents a specific change in the variable. For binary variables, the odds ratio is calculated for each value as a loan characteristic versus not a loan characteristic. Furthermore, for the continuous variables Indexed LTV, Interest Rate Reset Interval, Interest Rate Margin, Current LTI Ratio, and Loan Seasoning, the change in odds ratio is not constant across the spectrum. For example, the odds ratios for a 10% Indexed LTV change are greater from 90% to 100% versus 115% to 125%.

Variables Summary
Interest Rate Margins
The Dutch mortgage market is dominated by fixed-rate mortgages where the interest rate is set for a fixed period of time and adjusts to the relevant fixed rate at the reset date. For example, a five-year fixed-rate loan with a 30-year term would be set with an interest rate at origination equal to the five-year fixed rate offered by the lender. After the initial five-year fixed-rate period, the rate would reset to the five-year fixed rate offered by the lender at that point in time.

92% of the mortgages in the Dutch reference sample were reported as fixed rate with 8% classified as floating rate. Interest rate margins for both fixed- and floating-rate mortgages are generally used to assess the borrower's relative credit risk. However, interest rate margins were typically not reported for fixed-rate loans. An interest rate margin was estimated for each fixed-rate loan by first defining an index and then subtracting the index value, as of the most recent contractual reset date, from the reported interest rate. The defined index is a blend of the five-year Dutch government bond yield and the five-year Dutch swap curve. DBRS uses the same approach to estimate the interest rate margin on fixed-rate loans when using the DBRS Insight Model for Dutch mortgages.

Dutch Underwriting Score and Portfolio Score

The Dutch LSA includes two judgmental variables to assess the credit risk of Dutch residential portfolios: the Dutch Underwriting Score and the Dutch Portfolio Score. Each variable is an ordinal variable with three values as listed in Exhibit 1. Both the Dutch Underwriting Score and the Dutch Portfolio Score were developed to factor in considerations about the credit quality of a portfolio not necessarily observed in the loan-level data. The Dutch Underwriting Score allows an analyst to benchmark originators' underwriting quality and strategy, while the Dutch Portfolio Score can be used to address other factors which may have an impact on portfolio performance.

The Dutch Underwriting Score was constructed based on an assessment of the originating entities for loans in the EDW. The size and type of the lender were the main factors considered, where size (small, medium and big) was used as a proxy for the lender's market position and type (deposit-taking banks, insurance company or specialised lenders) as a proxy for the business model. The size classification was based on the market share of the lender in terms of outstanding mortgage loans (1% for small, between 1% and 10% for medium and above 10% for big). This ranking was done for bank and insurance firms separately and based on the outstanding mortgage loan balances published by the Dutch Central Bank. The type of lender was assigned on the general business model identified for the originator. In addition to this classification, DBRS assesses other qualitative factors when assigning the Dutch Underwriting Score to a transaction, including: length and consistency of originations, current underwriting guidelines and changes to underwriting guidelines.

As a result of this analysis, the underwriting score, as part of the LSA, comprises three different levels. The lowest risk, with all the other loan and borrower characteristics being equal, should be expected for lenders with a well-established track record and low risk profile in the form of, amongst other things, more prudent underwriting criteria and better historical performance. The highest risk should be applied to lenders with non-market standard practices or aggressive underwriting strategies. All other types of originators would fall into the market standard or medium risk category.

The Dutch Portfolio Score was estimated based on analysis of transactional performance data of 210 Dutch RMBS transactions in Intex from Q1 2000 to Q4 2012. The maximum 90-day plus delinquency rate of each transaction was set based on historical performance data. The distribution of the maximum values was analysed with good assigned to portfolios in the lower quartile, moderate assigned to the second and third quartiles and bad assigned to the fourth quartile. Deals were assigned a good, moderate or bad score independent of the Dutch Underwriting Score. The deal-level Dutch Portfolio Score from each transaction was subsequently assigned to each of the loans in the Dutch loan universe when constructing the Dutch LSA. Transactions included in the loan universe but not in the Intex dataset were assigned a Dutch Portfolio Score using a benchmark approach based on the transaction characteristics.

DBRS will assess both qualitative and quantitative factors to evaluate the potential deviation of expected performance versus loans with comparable characteristics when assigning the Dutch Portfolio Score. These factors can include either positive or adverse loan selection, or volatile historical performance from an issuer's securitisation programme.

Dutch Mortgage Products

The Dutch mortgage sector includes loan products where the loan balance does not amortise but a borrower also makes monthly payments to an additional repayment vehicle which are expected to accrue to the outstanding loan balance at maturity. These products include savings, investment and insurance loans (or possibly a combination). For the purpose of calculating the exposure at default of each of these products when estimating defaults, the loan balance is not assumed to amortise, effectively being treated as an interest-only loan. However, the amount of the repayment vehicle is calculated based on the expected loan amortisation given the loan characteristics and loan seasoning. This amount is applied to reduce the exposure at default when calculating losses.

Each of these repayment vehicles is expected to accrue to equal the balance of the outstanding mortgage at maturity. DBRS will assess the product specifications for each of these repayment vehicles to determine if there is a potential for a mismatch between the two balances at maturity, particularly for investment products and insurance products. If the product specifications are unclear as to the expected value at loan maturity, a discount to the par value of the repayment vehicle may be applied resulting in an increased exposure at default when calculating losses.

Each of these product types has potential for set-off risk in case of default of the relevant counterparty (i.e. mortgage originator, insurance company, or account bank). Structural features are included to mitigate this risk for some products (i.e. savings participation agreements for savings loans). In the case of insurance loans, set-off risk may be elevated if it is proven that the insurance policy and mortgage loan were part of the same financial arrangement allowing the possibility for the borrower to set off the mortgage loan liability against the life insurance asset. This risk is typically mitigated through a diversification of insurers within a transaction. DBRS will assess the potential set-off risk for loan products on a transactional basis and may apply a discount to the amount of credit given to the repayment vehicle in the loss calculation.

National Hypotheek Garantie (NHG Guarantee)

The NHG Guarantee is a national mortgage insurance scheme for eligible borrowers in the Netherlands administered by a central privatised entity (Stichting Waarborgfonds Eigen Woningen, the WEW) under strict eligibility criteria.

The scheme guarantees mortgage lenders against losses incurred following default and repossessions on eligible loans, including losses of principal, interest and costs associated with foreclosure. There are two significant circumstances where the NHG Guarantee either does not pay out at all or does not pay out the full amount claimed:

- Amortisation: the NHG Guarantee assumes that a loan amortises over a 30-year period regardless of the actual loan amortisation (as of January 2013 all loans backed by an NHG Guarantee should be repaid on a 30-year annuity basis). A mismatch between the mortgage balance and NHG Guarantee amount may exist depending on the type of loan guaranteed, original term of the loan and seasoning of the loan.

- Non-compliance with the NHG Guarantee: the NHG Guarantee has prescriptive eligibility rules and the lender is responsible for ensuring each application meets the NHG conditions. In the event that the loan was underwritten in breach of eligibility rules, all or part of the claim amount may not be paid by the NHG. Additionally, in the case of proven fraud the NHG Guarantee will not pay out any of the claim amount.

The NHG guarantee benefit is applied in the European RMBS Insight Model as additional proceeds to cover periodic losses as defined under the scheme.[2] The NHG Guarantee will only cover the losses on the guaranteed outstanding loan balance according to the 30-year annuity schedule calculated by the original loan terms. For loans originated after 1 January 2014, 10% of the loss will not be covered by the guarantee. Further, the NHG can reject a lender's claims and a so-called rescission rate is applied to account for potential non-compliance with the NHG terms.

Higher rescission rates effectively reduce the amount of the NHG guarantee. DBRS analysed over 5,000 cases from multiple lenders where a loss to the NHG was claimed. The historical mean rescission rate observed on this sample is 26%. In the absence of data provided by the issuer, DBRS applies a base rescission rate of 25% in the BBB and below rating scenarios. A different base rescission rate may be applied if supported by historical data. DBRS assumes higher rescission rates in higher rating scenarios and applies the following increase to the base rescission rate at the respective rating level in the periodic loss calculation.

Rating Stress Scenario	Rescission Rate Increase
AAA	15%
AA	10%
A	5%
BBB and below	0%

2. See Appendix A for further details.

Dutch Segmentation and Delinquency Migration Matrices

The Dutch LSA was applied to approximately 1,762,000 loans to estimate a loan-level score and assess the distribution of scores. 12 risk segments were identified for the purpose of calculating Dutch DMMs with a corresponding DMM for each risk segment. Exhibit 2 below shows cumulative percentiles for the distribution of scores within each risk segment. Additionally, Exhibit 2 shows the low and high Dutch LSA score for each of the 12 risk segments.

Exhibit 2 – Dutch LSA Score Distribution

Segment	Cumulative Percentile	Low	High
1	10%	0.0%	4.2%
2	20%	4.2%	6.2%
3	30%	6.2%	8.3%
4	40%	8.3%	10.7%
5	50%	10.7%	13.4%
6	60%	13.4%	16.6%
7	70%	16.6%	20.4%
8	80%	20.4%	25.2%
9	90%	25.2%	32.7%
10	94%	32.7%	37.9%
11	98%	37.9%	47.6%
12	100%	47.6%	100.0%

DMMs are calculated for each risk segment by computing the average roll rate observed in the loan-level data between Q1 2013 and Q2 2016. For the Netherlands, the roll rates measure the quarterly transition rates between the six states described in the DBRS *European RMBS Insight Methodology*.[3]

The risk segmentation exhibits separation in the default risk across the distribution of loan scores. When iterating the DMM within each risk segment over time, higher cumulative default rates are calculated for higher-risk segments. Exhibit 3 shows the cumulative defaults forecasted per risk segment over 50 iterations for a non-amortising pool[4] of current loans as of period zero.

Exhibit 3: Cumulative Default Expectation per Dutch Risk Segment
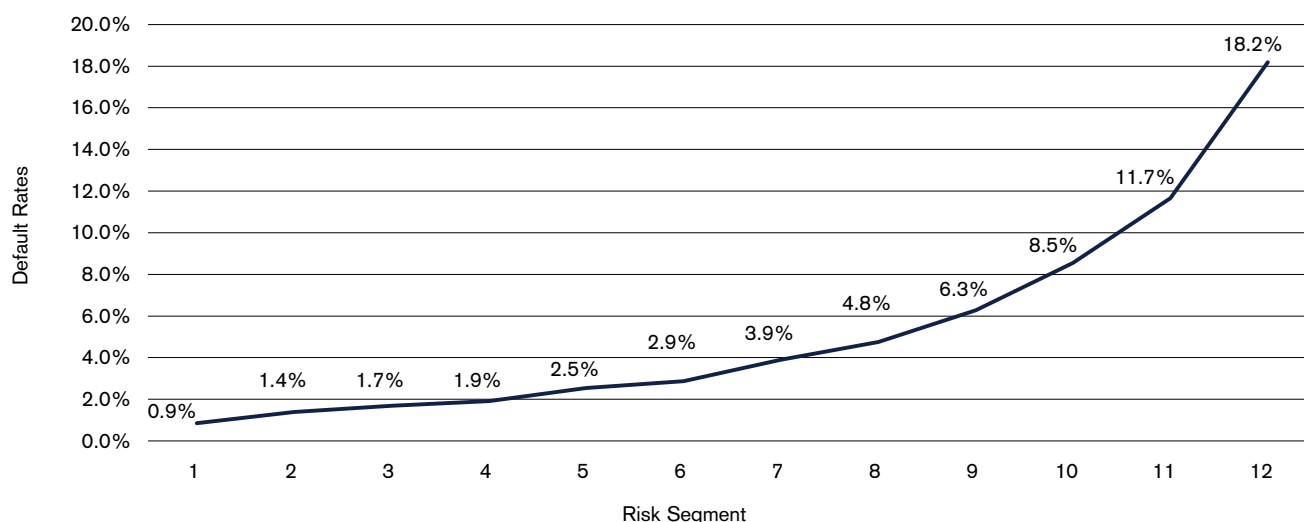
3. The six states are DQ0, DQ1, DQ2, DQ3, Default and Redeemed.
4. Assumed 0% conditional prepayment rate (CPR).

Looking at Exhibit 2 and Exhibit 3 together, for a portfolio of current non-amortising Dutch loans, the following could be expected:

- For a high-quality portfolio in which all the loans have an initial Dutch LSA score less than 4.2%, risk segment one, the expected default rate would be approximately 0.9%.

- For an average-quality portfolio in which all the loans have an initial Dutch LSA score between 10.7% and 13.4%, risk segment five, the expected default rate would be approximately 2.5%.

- For a low-quality portfolio in which all the loans have an initial Dutch LSA score greater than 47.6%, risk segment 12, the expected default rate would be approximately 18.2%.

Exhibit 3 illustrates a simplified estimate of potential default rates for each of the 12 different segments. In this example, the respective DMM for each risk segment is applied to a portfolio of performing non-amortising loans for 12.5 years. Ultimately, a forecasted portfolio default rate will be a function of the underlying loan characteristics and each loan's amortisation profile. The loan amortisation profile determines the exposure at default (EAD) to calculate the periodic loan-level defaults. For the Netherlands, the EAD for a given period is equal to the outstanding loan balance 12 months[5] prior to the loan defaulting, which is reflective of market practice for recognising defaults.

Dutch Correlation

The correlation applied to each portfolio for estimating rating scenario default rates is a function of the expected default rate of the portfolio. Correlations assigned to each portfolio range from 12% to 30% with higher-default portfolios assigned lower correlations and lower-default portfolios assigned higher correlations (Exhibit 4). The scale of correlations for each expected portfolio default rate is based on a modification of the Basel III framework.[6]

Exhibit 4: Dutch Correlation
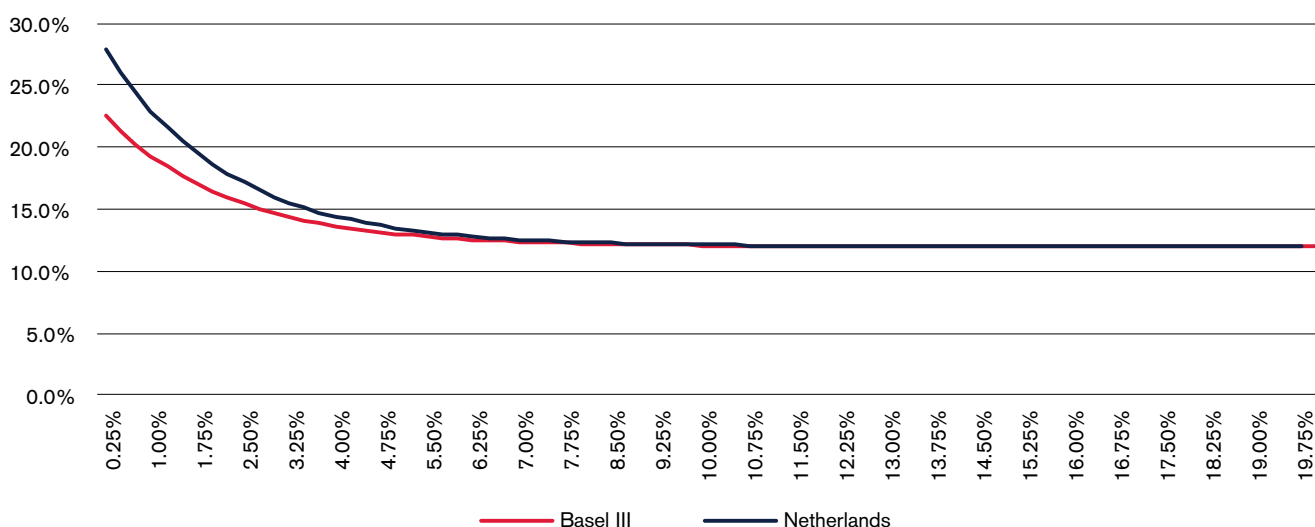
DBRS estimated correlations from the data across the risk segments between 3.0% and 5.0%. The correlations were estimated during a period of relatively benign macroeconomic conditions (decreasing and low interest rates, low unemployment and stable house prices). During periods of economic stress, risks not reflected in the available data may influence the performance of portfolios with lower-expected defaults versus those with higher-expected defaults. As a result, DBRS has applied higher correlations for lower-default portfolios.

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5. Defined as "k" in the Base-Case Default Rates section of the European RMBS Insight Methodology.
6. Asset correlation for corporate, sovereign and bank exposures assumption per Basel III – BIS, Basel III: A global regulatory framework for more resilient banks and banking system, December 2010, pg. 39.

Dutch House Prices[7]

The Dutch MVDs are estimated at the national level and for the 12 provinces of the Netherlands as reported by Statistics Netherlands. Statistics Netherlands reports quarterly data since 1995 for each of the Dutch provinces. Real house prices were calculated using the harmonised CPI data with June 2000 as the base year. MVDs typically applied for each of the 12 provinces and the national level are shown below in Exhibit 5. MVDs are applied to the updated property value to discount the sale price of a property to calculate periodic losses.

Exhibit 5: Dutch MVDs

Region	AAA	AA	A	BBB	BB	B	Volatile	Overheated
Drenthe	-24.45%	-19.94%	-15.64%	-11.17%	-6.33%	-3.77%	No	No
Flevoland	-23.66%	-19.65%	-15.48%	-11.19%	-6.26%	-3.70%	No	No
Fryslân	-26.68%	-22.14%	-17.54%	-12.76%	-7.57%	-4.55%	No	No
Gelderland	-24.91%	-20.19%	-15.89%	-11.31%	-6.44%	-3.86%	No	No
Groningen	-23.90%	-19.68%	-15.59%	-11.18%	-6.41%	-3.86%	No	No
Limburg	-22.75%	-18.74%	-14.63%	-10.38%	-5.88%	-3.45%	No	No
North Brabant	-24.20%	-19.86%	-15.78%	-11.33%	-6.46%	-3.85%	No	No
North Holland	-27.79%	-22.52%	-17.83%	-13.06%	-7.68%	-4.70%	No	No
Overijssel	-24.30%	-19.60%	-15.41%	-11.12%	-6.36%	-3.79%	No	No
South Holland	-23.70%	-19.58%	-15.55%	-11.13%	-6.30%	-3.77%	No	No
Utrecht	-25.83%	-21.20%	-16.53%	-12.07%	-7.02%	-4.23%	No	No
Zeeland	-25.10%	-20.37%	-16.19%	-11.75%	-6.83%	-4.11%	No	No
TOTAL	**-23.85%**	**-19.19%**	**-15.04%**	**-10.76%**	**-6.09%**	**-3.62%**	**No**	**No**

Exhibit 5 also includes the market status for purposes of the MVD simulation where markets are considered overheated if the real House Price Index (2000=100) has increased above 150 in the most recent run-up and has yet to drop below 85. Volatile indicates if a market has ever been overheated. An overheated market which drops again below 85 is considered to be normal again, but will continue to be looked at as volatile. Currently, none of the Dutch provinces are classified as volatile or overheated.

Dutch Distressed Sale Discount

The Dutch Distressed Sale Discount (DSD) assumption is typically 20%. This is based on analysis of over 9,800 repossessed properties which were sold between 2002 and 2015. The dataset includes sold properties from the EDW as well as foreclosure and NHG claim data provided to DBRS by Dutch servicers. DSDs are applied to the expected property value after applying the MVD and meant to address a property sale in a liquidation scenario.

Dutch Foreclosure Costs

DBRS estimates Dutch foreclosure costs to be typically 3.0% of the outstanding loan balance at the time of default and a fixed cost of EUR 3,500. DBRS's estimates of the variable and fixed costs are based on information from its operational reviews and servicer feedback.

DBRS recognises that, in periods of high economic stress, it may be difficult or even impossible to find a market-clearing price for residential real estate resulting in potential losses, which may be greater than those implied by stressed liquidation values. The LGD assumptions are therefore typically floored for the AAA, AA, A and below-A rating scenarios at 25%, 20%, 15% and 10%, respectively. In the case of a loan part enjoying the benefit of a NHG guarantee, these floors are typically only applied to the rejected amount (see rescission rates in the section NHG Guarantees).

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7. See European RMBS Insight Methodology for further details.

Dutch CPR Assumptions

Dutch conditional prepayment rates (CPRs) have exhibited a wide range of variability since 2011 as seen in Exhibit 6. The median 12-Month CPR has ranged between 5% and 10% and exhibited mean reversion trend in 2017. The trends in CPRs can be attributed to a combination of factors including the term structure of Dutch loans, liquidity available to borrowers and a decreasing interest rate environment.

Exhibit 6: Dutch 12 months CPR
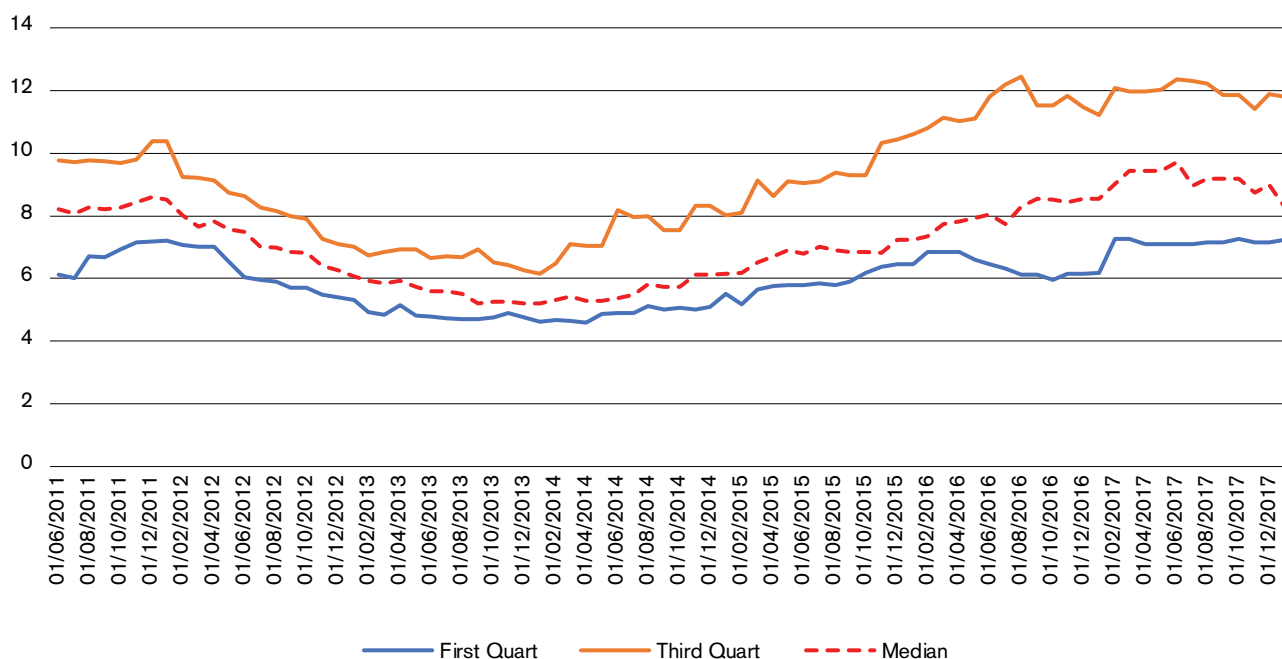
Source: Intex, DBRS.

As described earlier, the market is characterised by fixed-rate mortgages where the interest rate is set for a fixed period of time and adjusts to the relevant fixed rate at the reset date. CPRs would be expected to be low during the fixed-rate period with increases occurring after the initial reset date if more attractive financing opportunities are available. As seen in Exhibit 7, the interest rate environment since 2010 has been improving year over year. Between Q1 2010 and Q3 2017, mortgage rates for loans with a fixed rate term between one and five years have decreased to 2.2% from 4.7% approximately. Mortgage rates for terms greater than ten years have decreased to 3.0% from 5.2% over the same time. Quarterly origination volumes in 2017 varied between EUR 20 and 25 billion (although still below peak volume of EUR 36 billion in 2005).

Exhibit 7
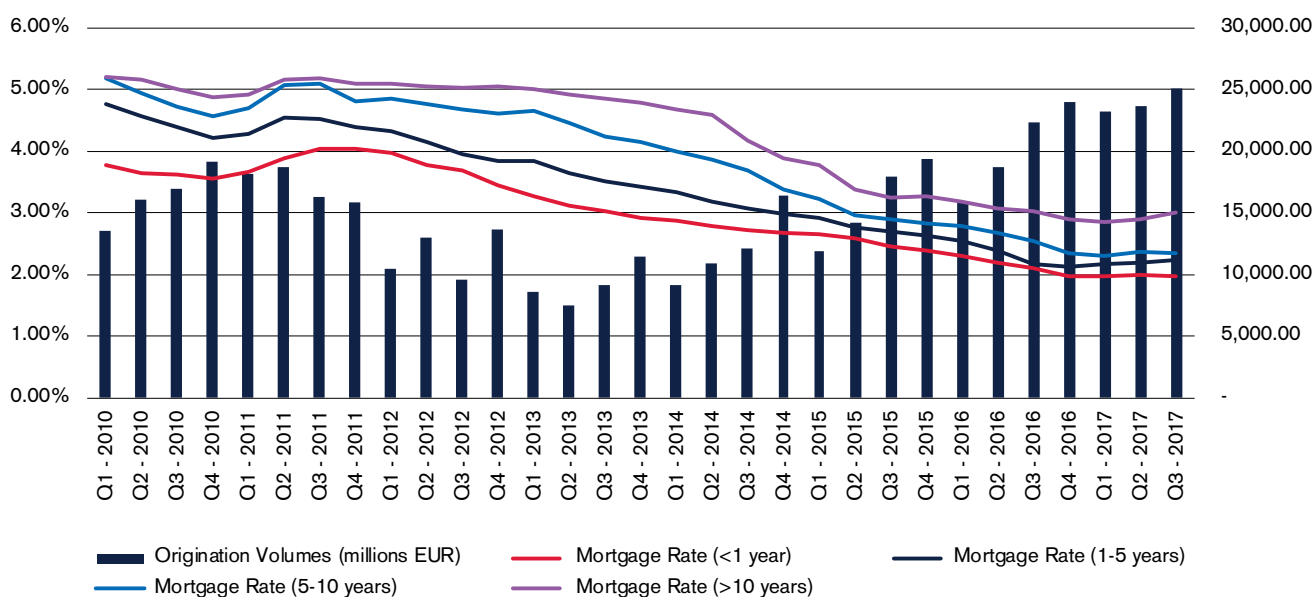
Source: DNB, Haver, DBRS.

DBRS assumes a 5% CPR over the life of the transaction for the Dutch LSA. The 5% is slightly below the averages observed in market data. However, as seen in Exhibit 6, this is during a time of declining interest rates towards extremely low levels. CPR assumptions may be adjusted depending on the underlying portfolio characteristics, including the distribution of interest rate resets and level of interest rates.

Dutch Cash Flow Assumptions

Prepayments
Three prepayment stresses are generally run for the DBRS cash flow stresses. The assumptions for the Netherlands are typically 5% - Slow, 10% - Middle and 20% - Fast.

Recovery Timing
The Dutch recovery timing assumption for cash flow analysis is typically 24 months. This is based on further analysis of the repossessed loans used to estimate the Dutch DSDs. The recovery timing is the time between the first period in which a loan stops contributing principal and interest payments to the collections and the receipt of the recoveries on the loan.

Appendix A

DBRS assumes the guarantee always ranks first in the application of collateral proceeds.[8] Losses for loans without the NHG Guarantee are calculated as follows, with adjustments made to the Loss definition found in the *European RMBS Insight Methodology:*

Loss (No NHG) = Max (0, EAD – Collateral Proceeds + Foreclosure Costs)
Where

- EAD = Exposure at Default

- Collateral Proceeds = Sales Prices + Repayment Vehicle Collateral

- Sales Price = EPV * (1-MVD) * (1-DSD)

- Repayment Vehicle Collateral = Hypothetical scheduled balance of the savings, life insurance or investment balance on the basis of annuity payments.[9]

Borrowers with a repayment vehicle are contractually obligated to make those payments. In its asset model, DBRS will assume that products with repayment vehicles (savings, insurance or investment contracts) are treated as interest-only loans. As a result, the EAD of these loan products does not amortise over time. DBRS may apply a haircut to the expected accrual amount if set-off risk is determined to be material or if there is uncertainty over whether the accrual schedule will match the outstanding balance. DBRS will consider the characteristics of the savings, life insurance and investment products to establish whether to apply any haircuts in its analysis.

The Sales Price is estimated by first indexing the property value, then applying an MVD and then finally applying a DSD. Expected Property Values are indexed using the home price index published by Statistics Netherlands.

Where the NHG Guarantee is applied, losses are calculated as follows:

Loss (NHG) = Max (0, EAD – Collateral Proceeds + Foreclosure Costs – NHG Payout)

The amount of NHG Payout is a determined by

1. Calculating the expected balance based on a 30-year amortisation profile;

2. Calculating the covered balance as the minimum of the EAD and the expected balance calculated in point one;

3. Calculating the NHG Payout as the covered balance, less Collateral Proceeds, plus Foreclosure Costs, if this number is positive; and

4. Discounting the NHG Payout by 10% for loans originated after 1 January 2014 to account for the loss-sharing provision implemented by Stichting Waarborgfonds Eigen Woningen.

The final loss for NHG loans is calculated to account for rescission rates:

Loss (Final) = Loss (NHG) * (1-RR) + Loss (No NHG) * RR
Where

- RR = Rescission Rate

A rescission rate of zero would result in the final loss being equal to the Loss (NHG), meaning full benefit is given to the NHG Guarantee. A rescission rate of 100% would result in the final loss being equal to the Loss (No NHG), meaning no benefit is given to the NHG Guarantee.

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8. DBRS assumptions regarding the application of collateral proceeds are based upon a review of NHG's Conditions & Norms 2016-2 and discussions with market participants.
9. DBRS computes the hypothetical balance as the difference of the outstanding loan balance at the pool cut-off date and the expected amortisation schedule given the outstanding balance, remaining term and interest rate.