

# Canada Residential Mortgage Rating Criteria

## Sector-Specific Criteria Report

### Scope

This report details Fitch Ratings' methodology for analyzing Canadian residential mortgages collateralizing new and existing covered bond programs, as well as residential mortgage-backed securities (RMBS). The criteria should be read in conjunction with the reports listed below, directly beneath Related Criteria.

The methodology outlines Fitch's loan-level model for estimating losses on Canadian residential mortgage loans and the cash flow assumptions the agency uses when analyzing Canadian covered bond programs and Canadian RMBS.

### Key Rating Drivers

The following is a list of the key rating drivers in order of relevance to Fitch's analysis.

**Borrower Equity:** The strongest driver of default in the model is the borrower's equity in the property, as determined by the sustainable loan-to-value ratio (sLTV). The sLTV takes into account any overvaluation identified by Fitch's proprietary Canadian RMBS Sustainable Home Price (SHP) methodology. The sLTV is also a key driver in the loss severity (LS) calculation.

**Borrower and Loan Attributes:** In addition to the sLTV, Fitch identified five other borrower and loan attributes that are predictive of default. The borrower credit score ranks second in terms of impact on a borrower's probability of default (PD) risk, with total debt service ratio (TDSR), loan purpose, occupancy and property type comprising the remaining attributes.

**Liquidation Timelines and Costs:** In addition to the home price decline projection, the LS derived for each loan also factors the length of time to sell the property, as well as legal costs, sales commissions and other expenses associated with the maintenance and upkeep of the property during the liquidation period.

**Rating Stresses:** Rating stresses involve a two-step process under which home prices are first reduced to their sustainable value and then subjected to a further stress that corresponds to each rating category. As there is limited performance data on the Canadian housing market during a distressed period, Fitch looks to the U.S. as a proxy and applies its U.S. residential mortgage stresses to Canadian mortgage pools. The 'AAA' market value decline (MVD) stress assumes that home prices decline below the sustainable value by 35%.

**Cash Flow Analysis:** The cash flow analysis tests the adequacy of the underlying collateral cash flows to pay P&I on the rated obligations, in accordance with the transaction documents. The key drivers of the cash flow analysis include the PD and recovery rate of the underlying assets, default and prepayment timing, asset sales and interest rate and foreign exchange exposure.

### Canadian RMBS Loan Loss Model Overview

Fitch's Canadian RMBS loan loss model was developed to assess the credit risk of residential mortgage loans collateralizing covered bonds and RMBS under base and stressed home price and macroeconomic scenarios. The major components of the mortgage loss model are discussed in this criteria report, including the PD, LS and rating stress frameworks. The credit loss component of the break-even overcollateralization (BE OC) for the covered bond programs is published in Fitch's rating action commentaries.

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This report replaces "Canada Residential Mortgage Rating Criteria," dated April 30, 2020.

### Related Criteria

- [Global Structured Finance Rating Criteria \(March 2021\)](#)
- [Covered Bonds Rating Criteria \(November 2020\)](#)
- [Structured Finance and Covered Bonds Interest Rate Stresses Rating Criteria \(November 2020\)](#)
- [U.S. RMBS Loan Loss Model Criteria \(October 2020\)](#)
- [Structured Finance and Covered Bonds Counterparty Rating Criteria \(January 2020\)](#)

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Borrower home equity is the primary driver of mortgage borrower behavior. Home price projections and true homeowner equity are determined using Fitch’s SHP methodology, which provides a forward-looking, countercyclical view of prices. The SHP approach calculates a sustainable market value decline (sMVD) assumption expressed in real terms at the central statistics area, or the provincial or national level for each loan, which represents the difference between the home value at origination and what Fitch believes to be the home’s long-term sustainable value based on long-term market conditions. The sMVD is a significant driver in both the PD and LS calculations.

### Loss Analysis: Probability of Default

The PD component of the model estimates the probability that a loan will default based on various loan and borrower characteristics, as well as Fitch’s SHP forecasts. Through a regression analysis, Fitch identified six principal drivers of default. For categorical attributes, such as occupancy status, property type and loan purpose, one credit attribute within each variable represents the baseline from which the relative risk of other attribute(s) are measured, holding other factors constant. For example, the occupancy variable consists of owner-occupied and investor property attributes. Owner-occupied is the baseline attribute against which risk of default for investor properties is measured.

The remaining variables are continuous, such that the default risk rises or falls with changes in the attributes across their entire scale. PDs derived for such variables as LTV, credit score and TDSR reflect the observed relationship between default rates and the LTV, credit score or TDSR value. In application, the LTV variable is adjusted by Fitch’s SHP methodology to create an sLTV.

Additional risks associated with delinquent loans, which were analyzed outside the regression, are accounted for by PD penalties applied on a loan-level and rating stress basis. Fitch also applies a separate PD adjustment at the pool level to address risks arising from provincial geographic concentrations that differ greatly from actual population distributions. Finally, loan-level PDs are subject to floors at each rating category to ensure a minimum default assumption is applied, particularly for loans with very low LTVs. The following section details each PD variable and its application for determining the base PD.

Fitch has identified six key variables as strong predictors of borrower default.

#### Probability of Default

Probability of Default Variables	Loan Attributes	Baseline Attribute/PD Relative to Baseline
Credit Score (Beacon)	Continuous	Higher Credit Score = Lower PD
LTV	Continuous	Higher LTV = Higher PD
TDSR	Continuous	Higher TDSR = Higher PD
Occupancy	Owner Occupied	Baseline
	Investor	Higher
Property Type	Single Family	Baseline
	Non-Single Family	Higher
Loan Purpose	Refinance	Baseline
	Purchase	Higher

Source: Fitch Ratings.

#### Multicomponent Mortgage Considerations

For borrowers with multiple amortizing mortgage tranches secured by the same property, the aggregate of all loan amounts is used when calculating the LTV to determine the PD. For multicomponent mortgage products that include a home equity line of credit (HELOC) component, Fitch also factors the maximum LTV that is available to the borrower for future draws under the total mortgage facility when determining the PD for such loans. However, as long as all amortizing tranches are included in the mortgage pool, LS is calculated only on the total outstanding balance of such tranches, and not on any revolving amounts drawn but not included in the cover pool or available for future draws on the HELOC, provided such revolving amounts are subordinate to the amortizing loan parts.

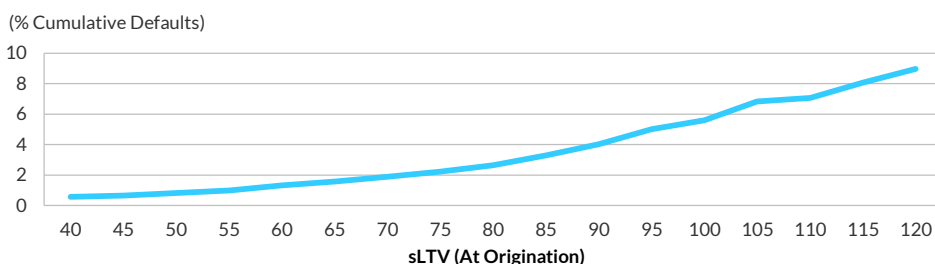
Fitch’s PD calculation for multicomponent mortgages considers amounts that can be drawn on associated lines of credit.

Should a lender not include all subsequent amortizing loan tranches in the cover pool, Fitch may adjust the LS to reflect the diversion of proceeds to external unpledged loan parts with equal payment priority to those in the pool. If an issuer is unable to provide periodic data on subsequent tranche exposures outside the subject pool, Fitch may decline to rate the related issuance.

### Probability of Default Variable 1: Sustainable Loan to Value Ratio

Fitch adjusts property values and LTVs based on its SHP methodology, which adjusts the home price to reflect the risk of overvaluation. To arrive at the sustainable value, first, the sales price or appraised value provided by the issuer is adjusted for any updated appraisal or by observed home price changes since origination based on movements in the Teranet – House Price Index. This value is then adjusted by the sMVD, as calculated by the SHP approach, to derive the loan’s sLTV. This derived sLTV is Fitch’s base case sLTV. In rating scenarios above the base case, the sLTV will also reflect stressed declines below the calculated SHP projection. For more information on these stresses, refer to the Generating Rating Stressed Losses section.

### Model Cumulative Default by sLTV



Note: In analysis, defaults defined as over 60+ days DQ.  
Source: Fitch Ratings.

For newly originated loans that are not seasoned (i.e. those that have not yet been renewed), no update to the initial sales price or appraised value is necessary, and these values are simply adjusted by the sMVD.

The SHP approach calculates the declines necessary to return current values to sustainable home prices based on historical analysis of the long-term relationship between home price and income growth. For homes in markets considered to be potentially overvalued by the SHP methodology, the PD model views the borrower as having less equity than the loan underwriting and original LTV would imply. Because of uncertainty over the timing of default and the five-year tenor of mortgage loans, Fitch assumes that the MVDs occur instantaneously with no timing vectors employed. Refer to Appendix B for a description of the methodology employed in creating the SHP framework.

### Probability of Default Variable 2: Credit Score

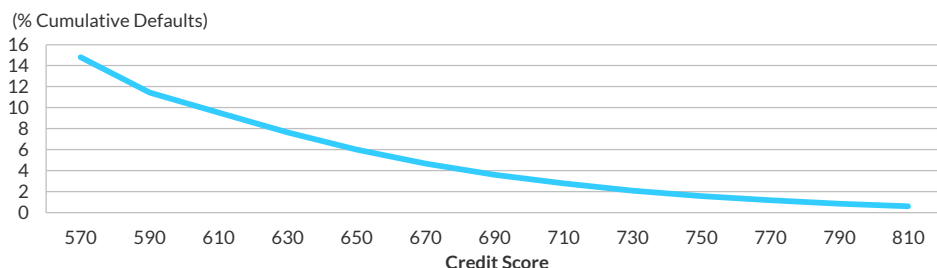
Credit score is also a key driver of default in Fitch’s model, as the data analyzed by Fitch showed a strong relationship to default risk. Fitch’s regression analysis utilized borrowers’ credit scores at loan origination as determined by Equifax’s BEACON scoring system, which is based on Fair Isaac Corp.’s FICO model and widely used by Canadian lenders. The data analyzed by Fitch showed a strong inverse relationship between borrower default and credit score. Fitch believes the better-than-projected performance of borrowers at the lower end of the credit spectrum (scores of less than 620) is attributable to the small number of observations in that cohort, as well as the presence of mitigating factors not captured by the regression, such as home price appreciation (HPA) and low interest rates. Since rising values and low rates are not sustainable in a more normal economic environment, Fitch considers higher PD assumptions for very low credit quality borrowers to be appropriate.

With all other variables remaining unchanged, a higher borrower credit score, which indicates a sound repayment history of debt obligations, results in a lower PD assumption. Credit score is incorporated into Fitch’s regression model as a continuous variable.

Original credit scores, or updated scores when provided, will be taken into account in Fitch’s analysis. For loans originated based on the use of credit scores other than BEACON, Fitch will

request performance data for the scores used, as well as how they map to the BEACON scale. This information will be used to determine the BEACON-equivalent score to be run in the model for the relevant alternative credit score product.

### Model and Observed Cumulative Defaults by Credit Score

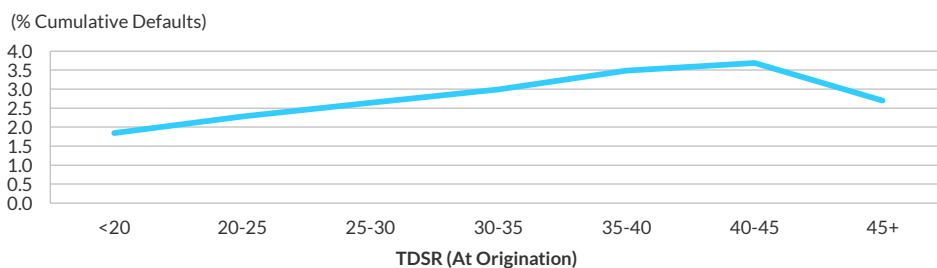


Note: In analysis, defaults defined as over 60+ days DQ.  
Source: Fitch Ratings.

### Probability of Default Variable 3: Total Debt Service Ratio

Default expectations are also driven by an analysis of TDSRs, which reflect a borrower’s total debt burden and indicate a borrower’s ability to withstand financial shocks, such as those caused by unemployment, a divorce or interest rate spikes. The TDSR is calculated as the ratio of housing-related expenses, including periodic P&I, taxes, insurance, heating, utilities and any other debt obligations (i.e. auto loans and credit cards) to monthly gross income.

### Model and Observed Cumulative Default by TDSR



Note: In analysis, defaults defined as over 60+ days DQ.  
Source: Fitch Ratings.

Fitch’s regression analysis indicated that borrowers with lower TDSRs at origination had a lower default rate than those with higher TDSRs. Like credit score, TDSR is also incorporated as a continuous variable in Fitch’s default model. The 45+ TDSR bucket has lower observed cumulative default rates because 45+ TDSR loans generally have lower LTVs and higher FICO scores.

TDSRs are obtained directly from lenders that may employ variations in calculations leading to differences across originators. Fitch does not make any adjustments to the TDSR data unless the information provided is confirmed by the issuer to be a filler number, in which case Fitch treats the data as missing. The default TDSR value of 45%, as described above, will be applied where loan-level TDSR data are missing.

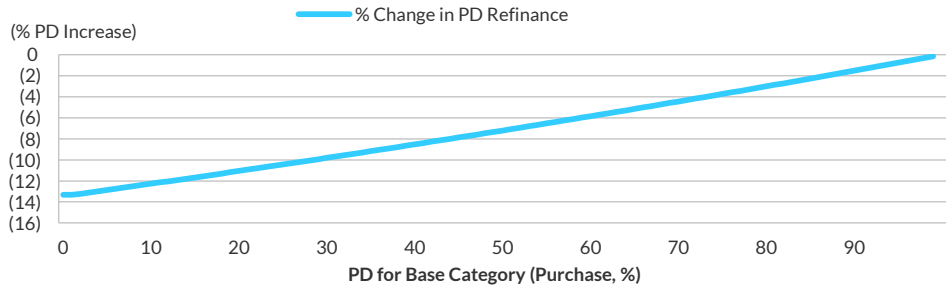
### Probability of Default Variable 4: Loan Purpose

Based on the 2014 dataset, Fitch observed a higher default rate among purchase loans than renewals/refinances. Fitch believes renewals/refinances outperformed purchases in the historical dataset, primarily due to increases in home equity driven by significant HPA in the preceding decade and amortization of principal. Increased equity provides a strong incentive to repay the mortgage or sell the property if a borrower becomes financially stressed.

In addition, the low interest rate environment of the preceding years has benefitted borrowers who were able to renew or refinance into lower-rate mortgages. While low rates usually reduce payments for all borrowers, higher home prices usually result in larger loan sizes, eroding much of the benefit for new buyers. For this reason, as well as the potential for a large

percentage of first-time homebuyers whose limited credit history is not fully captured by reported credit scores, purchase loans are assigned a higher PD than renewals/refinances.

**Example PD Adjustments by Loan Purpose**



Source: Fitch Ratings.

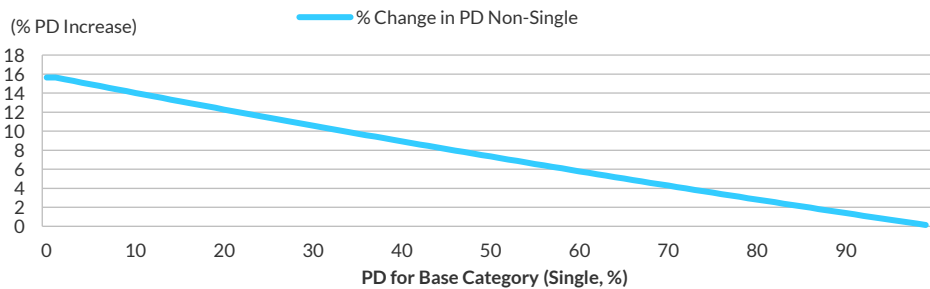
**Loan Purpose**

(PD Adjustment %) <sup>a</sup>	
<b>Category</b>	
Purchase	Baseline
Refinance (%)	(10)
<sup>a</sup> Approximate PD (rounded to nearest 5%) adjustment relative to the baseline. Source: Fitch Ratings.	

**Probability of Default Variable 5: Property Type**

Single-family detached and attached (collectively referred to as SFD) properties have historically exhibited lower default rates than other dwelling types. As a result, mortgages on non-SFD properties receive a PD penalty compared to the SFD baseline. Multifamily homes are more prone to default risk since the borrower may be relying on rental income on the property to help pay the mortgage, and the limited liquidity of these properties can increase default risk. Other property types, such as condominiums and co-ops, may experience higher default rates than SFDs due to their riskier borrower base (i.e. first-time homebuyers, speculative investors, foreign nationals/new to Canada).

**Example PD Adjustments by Property Type**



Source: Fitch Ratings.

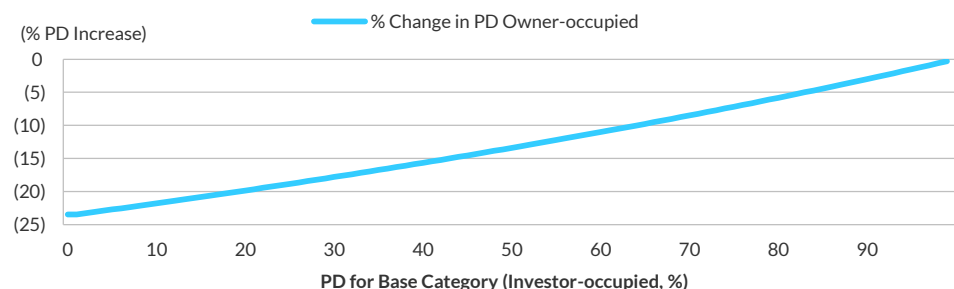
**Property Type**

(PD Adjustment %) <sup>a</sup>	
<b>Category</b>	
Single Family	Baseline
Non-Single Family (%)	15
<sup>a</sup> Approximate PD (rounded to nearest 5%) adjustment relative to the baseline. Source: Fitch Ratings.	

**Probability of Default Variable 6: Occupancy**

Investment properties are assigned a higher default rate than the owner-occupied (primary and second home) baseline. Fitch attributes the higher default rates to the effect of speculative investments and the high-risk nature of rental properties. A borrower in financial distress is more likely to prioritize payments on an owner-occupied property, and speculative investing can result in higher default rates if market stress makes it difficult for the borrower to break even if forced to sell. Additionally, for rental properties, the borrower is relying on income from external sources to repay the mortgage, which reflects an additional risk. The investment property penalty may be increased above the minimum thresholds up to twice the current assumption presented based on the quality of the lender’s underwriting guidelines and historical portfolio performance.

### Example PD Adjustments by Occupancy



Source: Fitch Ratings.

### Additional Probability of Default Adjustments

In addition to the six variables in the regression model listed above, there are other important factors that are significant determinants of default in Fitch’s model framework, including:

- current delinquency status;
- pool geographic concentration; and
- refinance risk.

#### Delinquency Status

Fitch found in its data analysis that the current delinquency status of a loan is a significantly more important determinant of foreclosure than loan and borrower characteristics. For these reasons, separate PD assumptions are made for loans that are delinquent, where the applied PD will be the maximum of the model output and the delinquency PD floors. The increases in PD assumptions are progressively higher in higher rating scenarios to reflect the greater likelihood of delinquent loans to be foreclosed under stressed conditions. Separate loan-level PD adjustments are applied to delinquent mortgages to account for their higher default risk.

#### Delinquent Loan PD Floors

(%)	30 Days+	60 Days+	90 Days+
AAAsf	55	70	100
AAsf	50	65	95
Asf	45	60	90
BBBsf	40	50	80
BBsf	30	45	75
Bsf	25	40	70
Base	20	35	65

Source: Fitch Ratings.

#### Pool Geographic Concentration

Fitch’s methodology assumes that the portfolio under analysis is broadly diversified and reflective of the average geographic distribution of the country’s population. A portfolio with a high concentration in a small number of regions is more vulnerable to local economic downturns or other localized market stresses.

For example, a portfolio concentrated in Alberta will be more at risk to swings in commodity prices than a pool with a typical Canadian population distribution (based on data reported by Statistics Canada, which Fitch will update at least annually), which benefits from diverse industries. To account for portfolios with significantly higher than average regional concentrations, Fitch will apply PD adjustments to the pool to reflect this vulnerability.

To evaluate concentration risk, Fitch compares the portfolio’s concentrations to the national population distribution on a provincial level. A pool’s concentration score is calculated as the

#### Occupancy

(PD Adjustment %)<sup>a</sup>

##### Category

Investor	Baseline
Owner-Occupied	(20)

<sup>a</sup>Approximate PD (rounded to nearest 5%) adjustment relative to the baseline.  
Source: Fitch Ratings.

Mortgage pools with geographic compositions that differ materially from the population distribution will receive a PD penalty to account for increased regional risk exposures.

sum of the excess of the pool concentration above the population distribution, allowing for a 10% buffer at each province. That is, a penalty is first applied when a pool's provincial concentration exceeds the province's population percentage by more than 10%. In the sample pool listed below, the sample pool Quebec percentage by loan count is 10%. It is below the Quebec population percentage. Therefore, there is no excess concentration.

On the other hand, the Ontario percentage in the sample pool is 55%. The concentration is 16 percentage points higher than the population distribution. After we subtract 10 percentage points from 16%, we will get the 6% concentration score. The concentration score is then multiplied by the maximum penalty of 50%, and the resultant geographic penalty is applied as a multiplier to the pool-level PD. The maximum penalty is derived from an analysis of the differences in three-month arrears observed across provinces from 1990–2015, as reported by the Canadian Bankers Association (CBA). In addition to this analysis, concentrations in select provinces may result in additional scrutiny on regional economies and housing markets, and sensitivity analyses for committee consideration; sensitivity analyses will be disclosed in transaction-specific research.

### Sample Geographic Concentration PD Adjustment Calculation

(%)	Population	Sample Pool	Excess Concentration	Excess Concentration Net 10% Buffer
Ontario	39	55	16	6
Quebec	23	10	0	0
British Columbia	13	10	0	0
Alberta	11	10	0	0
All Other Provinces	14	15	0	0
Concentration Score	0	6	–	6
Max Hit	50	50	–	–
Geographic Hit	0	3	–	3

Source: Fitch Ratings.

### Refinance Risk

Additionally, a 1.4x adjustment increase is made to the pool-level PD to consider the risk that some borrowers may not be able to obtain a loan from a new lender in the event that their initial lender is financially distressed at the time of their scheduled renewal. This adjustment is informed by the estimated increase in default probability from an increase in the borrower's monthly mortgage payment consistent with a 'AAAsf' rating stress scenario. Fitch estimated the average increase in total debt service coverage ratio could be approximately 20% higher as a percentage of the borrower's income. This equates to roughly a 40% increase in default probability.

The 1.4x adjustment to the pool-level PD is applied to all bank issuers. Non-bank issuers will receive a greater refinance risk adjustment due to the increased risk of the borrower not being able to refinance due to lack of financing options. The pool-level PD adjustment for non-bank issuers will be evaluated on a case-by-case basis and will be disclosed in transaction-specific research. See Appendix A for our analysis of pools originated by non-bank originators.

### Loss Analysis: Loss Severity

LS is calculated using an accounting-based approach that utilizes sMVD projections, quick-sale discounts and liquidation cost assumptions as key inputs. Each loan's LS percentage represents the loss amount calculated for each loan (i.e. loan balance less liquidation proceeds) expressed as a percentage of the loan balance. Loan-level loss severities are subject to floors at each rating category to ensure a minimum amount of loss given default.

Fitch calculates LS using regional projections of sMVD derived from its SHP methodology, combined with estimated carrying costs and liquidation expenses with an adjustment for inflation at the time of liquidation. A quick-sale adjustment (QSA) discount is applied to the

Fitch's model calculates LS based on an accounting approach that considers stressed sMVDs, a 15% QSA and estimated foreclosure costs and liquidation timelines that vary by rating category.

stressed- and inflation-adjusted market value of the property to reflect the discount at which distressed properties generally sell.

Foreclosure and liquidation costs, which include unpaid taxes, insurance, legal and other associated fees, are netted from recovery proceeds. Finally, carrying costs associated with accrued interest due on the loan also reduce total recoveries. If a servicer is not obligated to advance delinquent interest payments to a transaction, unpaid interest amounts will be deducted from total collections in Fitch's cash flow analysis, as they are incurred rather than factored into our loan-level LS estimate. However, these missed interest payments will still be taken into account in the expected loss on the aggregate pool, such that a transaction's advancing mechanism will affect the timing of losses taken on the assets rather than the total amount of loss realized.

After these adjustments, net recoveries are subtracted from the loan balance to determine a loan's LS, which is expressed as a percentage of the loan balance. The framework recognizes the pro-cyclical nature of defaults and recoveries, with higher loss severities occurring during periods of higher defaults.

### Loss Severity Calculation Example

	AAAsf Stress	Bsf Stress
Appraisal/Sale Value (\$)	300,000	300,000
Plus: HPA (15%) (\$)	45,000	45,000
Plus: Inflation (6%) (\$)	20,700	20,700
Less sMVD (29%)	106,053	106,053
Less: Stressed below sMVD (35%)/(10%) (\$)	90,877	25,965
Less: QSA (15%) (\$)	25,315	35,052
Resale Value (\$)	143,455	198,630
<b>Resale Value Less Expenses</b>		
Legal Costs (\$)	5,000	5,000
Taxes and Insurance Costs (\$)	15,300	8,925
Repair Costs (\$)	3,586	3,724
Sale Commission (\$)	7,890	10,925
Liquidation Costs (\$)	31,776	28,574
Carrying Costs (\$)	37,800	22,050
Net Recovery (\$)	73,879	148,006
Mortgage Amount (\$) (LTV = 70%)	210,000	210,000
Less: Net Recovery (\$)	73,879	148,006
Loss Amount (\$)	136,121	61,994
Loss Severity (%)	65	30

MVD - Market value decline. QSA - Quick-sale adjustment. LTV - Loan to value ratio. Note: Liquidation costs - Legal costs (\$5,000) plus taxes and insurance (1.7% of the appraised value per year), plus repair costs (1% of resale value) plus periodic maintenance (0.50% of resale value per year) plus sales commission (5.5% of resale value). Carry costs - Unpaid P&I (6% coupon rate annually). Liquidation timeline - 'AAAsf' = 36 months; 'Bsf' = 21 months.  
Source: Fitch Ratings.

### Loss Severity Variable 1: Sustainable Market Value Declines

In estimating the sale value of a property, appraised values are first adjusted by the sMVD. The sMVD estimates are derived from Fitch's SHP approach and adjust prices based on the risk of overvaluation. Fitch does not increase the property value for locations it views as undervalued. The sMVD assumptions applied in the LS calculations are consistent with those used in Fitch's PD calculation. Fitch assumes that the MVDs occur instantaneously, with no timing vectors employed.



### Loss Severity Variable 2: Quick-Sale Adjustment

Fitch applies a 15% QSA to all loans to reflect the discount on open-market values that sellers of foreclosed properties may have to accept to quickly find interested buyers and to account for distressed property conditions. The QSA discounts are applied as an incremental reduction to the property price after it is reduced by the sMVD.

As there is limited data on distressed sales in Canada, the QSA has primarily been derived from qualitative factors, which were built on the basis of discussions with lenders and potential risk considerations. In addition, Fitch looked to QSAs applied in other jurisdictions that have experienced housing market stress to assess the appropriateness of the assumption. Based on these considerations, Fitch applies a 15% QSA for all mortgages across rating scenarios.

### Stress Below Sustainable<sup>a</sup>

Stress Below Sustainable <sup>a</sup>						
(%)						
AAA <sub>sf</sub>	AA <sub>sf</sub>	A <sub>sf</sub>	BBB <sub>sf</sub>	BB <sub>sf</sub>	B <sub>sf</sub>	Base
35	30	25	20	15	10	0

<sup>a</sup>Assumptions are constant throughout each rating category.  
Source: Fitch Ratings.

## Generating Rating Stressed Losses

The product of each loan's PD and LS represents its base case loss expectation. Loss expectations derived for each rating category above the base case are determined by applying MVD stresses to the calculated sLTV.

Rating stresses applied to the property's sustainable value are based on a two-step process. Fitch first reduces each property from its current price to its sustainable value, which is produced by the SHP methodology. Next, the value is further reduced by a fixed percentage that Fitch has determined to be consistent with each rating category stress. For example, under the 'AAA' rating stress, Fitch assumes a property's value will decline an additional 35% below its sustainable value. While sMVD is the primary driver of the stress scenarios, additional stresses are also applied to liquidation timelines, which are extended in stress scenarios, resulting in higher costs and higher LS assumptions. LS and PD floors are also applied to ensure an adequate level of credit protection for loans with very low LTVs.

### Rating Stress 1: Stressed sMVD

A core objective of the model framework is to clearly associate rating stress levels with economic conditions and home price correction scenarios to aid investors in understanding the type of stress and the associated loss expectations each rating category represents.

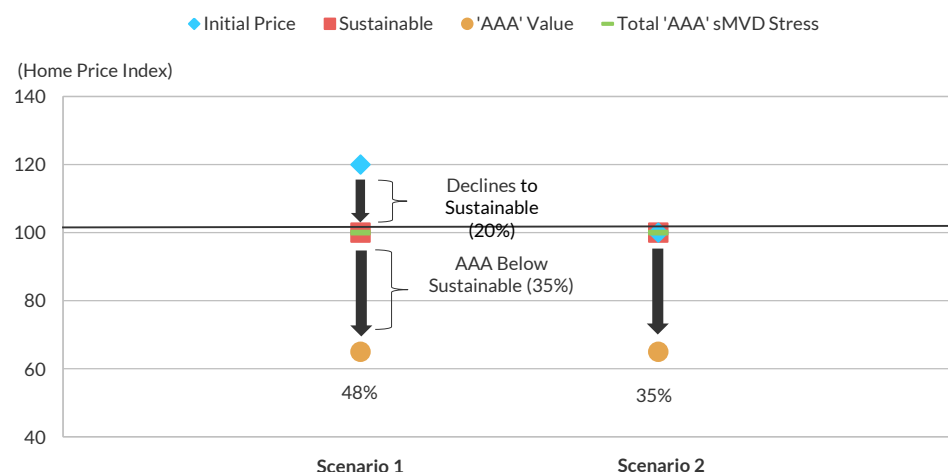
In this framework, the primary driver of stress levels is Fitch's sMVD, which is designed to be countercyclical and considers positioning in the housing market cycle. sMVD stresses increase in unsustainable price environments and decline as the housing market corrects and approaches sustainable levels. Fitch applies a two-step process whereby properties are first adjusted to their sustainable values through application of the sMVD, and then Fitch applies further stresses below this sustainable value to reflect different rating scenarios.

The base case sMVD reflects the unwinding of any potential market overvaluation to sustainability; higher rating stresses reflect scenarios where prices fall further below these values. sMVD stresses influence both PD and LS model calculations. When calculating a loan's PD, each loan is subjected to the sMVD rating category stress, which increases its sLTV and, therefore, its default probability. In estimating LS, the stressed sMVDs are applied as haircuts to the property value, thereby increasing the loan-level loss expected at each rating category.

While the declines to sustainable value are consistent with Fitch's base expectations, stresses beyond this base level reflect increasingly remote probabilities of occurrence. In the absence of empirical data on the performance of house prices in Canada during a period of severe stress consistent with a 'AAA' rating scenario, historical stresses from the U.S. market were used as a proxy, given the close link between the two economies.

The chart below illustrates the two-step process by which Fitch adjusts the value for a given property. In the example, the SHP methodology would calculate a property in scenario 1 to be 20% overvalued (base case sMVD = 20%). To determine the property's 'AAA' stressed sMVD, its current price is first reduced by 20% (step 1) to achieve its sustainable price level. Then the 'AAA' rating stress, an additional 35% decline from the sustainable price, is applied (step 2). This results in an "all-in" 48% 'AAA' stressed sMVD. In contrast, if a property is currently at its sustainable value, step 1 is not necessary, and the 'AAA' stressed sMVD reflects only the step 2 adjustment below sustainable (35%), as shown in scenario 2. This framework allows Fitch to make clear differentiations in its sMVD stresses across regional housing markets and at different points in the economic housing cycle.

### Example of sMVD Rating Stress Methodology Through the Housing Cycle



Source: Fitch Ratings.

### Rating Stress 2: Liquidation Timelines

Rating category stresses include assumptions made about liquidation timelines and costs, which are based on available industry data and information obtained from discussions with lenders. While defaults in Canada remain quite low, liquidation timelines have been gradually extending over the past several years. Under a severe stress scenario, Fitch would expect timelines to increase further, as the supply of distressed inventory exceeds homebuyer demand.

Stressed timelines are applied as incremental stresses to Fitch's base case timeline assumption, as displayed in the table below. For example, given the base case liquidation timeline of 18 months, the 'B' timeline assumption would be 21 months (three-month stress), and the 'AAA' timeline assumption would be 36 months (18-month stress). The timeline stresses discussed in this section apply to all loans, both newly originated and seasoned. The stressed timelines are used as inputs in Fitch's Covered Bonds Cash Flow Model when analyzing Canadian covered bond programs.

#### Liquidation Timeline<sup>a, b</sup>

Liquidation Timeline <sup>a, b</sup>						
(%)						
AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf	Base
36	33	30	27	24	21	18

<sup>a</sup>Properties located in Ontario, New Brunswick, Prince Edward Island and Newfoundland (non-judicial) have timelines shorter by four months. <sup>b</sup>Assumptions are constant throughout each rating category.  
Source: Fitch Ratings.

### Rating Stress 3: Loss Severity Floors

Fitch also incorporates LS floor assumptions into its model that are scaled by rating category. The floors range from 35% in the 'AAA' stress to 15% in the 'B' scenario. Loans that will be subject to these floors typically have very low LTV ratios and would be subject to minimal

credit enhancement without this approach. However, if loans with large amounts of equity become delinquent and are unable to avoid default through a sale, this may be indicative of problems such as unsubstantiated appraisals or property condition issues.

With respect to its application, the LS component of the model produces two stressed levels at each rating category. The first is generated by stressing the components of the LS calculation (sMVD, foreclosure timelines and the QSA, as described above), and the second is Fitch's defined floor for that rating category. The model applies the stress subject to the floors.

### Loss Severity Floors<sup>a</sup>

Loss Severity Floors <sup>a</sup>						
(%)						
AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf	Base
35	30	25	20	18	15	0

<sup>a</sup>Assumptions are constant throughout each rating category.  
Source: Fitch Ratings.

### Rating Stress 4: Probability of Default Floors

To ensure a minimum level of credit enhancement, Fitch also applies a minimum PD value at the loan level ranging from 1.2% in the 'B' scenario up to 7.0% in 'AAA'. For loans with especially low current LTVs, model results may not fully reflect the risks in a high stress environment, which may include large price drops, severe general economic stress or other unlikely scenarios that are not reflected specifically in loan attributes.

### PD Floors<sup>a</sup>

PD Floors <sup>a</sup>						
(%)						
AAAsf	AAsf	Asf	BBBsf	BBsf	Bsf	Base
7.0	5.8	4.7	3.5	2.3	1.2	0.0

<sup>a</sup>Assumptions are constant throughout each rating category.  
Source: Fitch Ratings.

## Rating Assumption Sensitivity

Fitch's sensitivity analysis provides three levels of rating sensitivities to demonstrate how the ratings would react to steeper MVDs than those assumed at issuance. The various rating sensitivities include defined stresses and defined sensitivities. The implied rating sensitivities are only indicative of some of the potential outcomes and do not consider other risk factors to which the transaction is exposed or are considered during the surveillance process.

### Defined Stresses

Defined stresses show the impact of three defined stress assumptions where the sustainable value derived by the SHP approach is five, 10 and 15 percentage points lower than that derived at issuance. These assumptions result in higher sLTVs and steeper sMVDs — the most significant drivers of PD and LS in Fitch's loss model. The table below shows the impact on ratings for each additional defined stress for a hypothetical residential mortgage pool.

### Defined Stresses – Sustainable Value

Original Ratings	5%	10%	15%
AAAsf	AAAsf	AAsf	Asf
AAsf	AAsf	Asf	BBBsf
Asf	Asf	BBBsf	BBsf
BBBsf	BBBsf	BBsf	Bsf
BBsf	BBsf	Bsf	<Bsf
Bsf	Bsf	<Bsf	<Bsf

Source: Fitch Ratings.

### Defined Sensitivities

Defined sensitivities describe the stresses to the assumptions required to reduce a rating by one full category, to non-investment grade and to 'CCC.' The variable being stressed in this analysis is Fitch's sMVD assumption. The percentage points shown in the table below reflect the additional MVDs that would have to occur to affect ratings for each defined sensitivity for a hypothetical residential mortgage pool.

### Defined Sensitivities sMVDs

(Percentage Points)

Original Ratings	One Full Category	Non-Investment Grade	To CCCsf
AAAsf	10	25	>30
AAsf	10	20	>30
Asf	10	15	30
BBBsf	10	10	20
BBsf	10	—	15
Bsf	10	—	10

Source: Fitch Ratings.

## Cash Flow Analysis Overview

Fitch applies its cash flow assumptions to determine if collections from the underlying collateral are adequate to support timely payments on the rated obligations based on the terms of the documents after determining expected loan-level losses. These assumptions are used as inputs in Fitch's Covered Bonds Cash Flow Model as part of the analysis of Canadian covered bonds. The model is used globally to assess the credit risk of Fitch-rated covered bonds as detailed in its "Covered Bonds Rating Criteria". Fitch may adjust the assumptions described in this section to the extent a Canadian RMBS transaction is collateralized with loans having attributes that differ from those securing covered bonds.

## Cash Flow Analysis Assumptions

Once expected losses are derived based on the analysis described above, Fitch analyzes the cash flows expected to be received from the collateral to determine if P&I will be paid on the rated obligations in accordance with the transaction documents. Assumptions that are made when analyzing cash flows for both covered bonds and RMBS include the following:

- prepayments;
- servicing fees;
- default timing; and
- negative spread on cash reinvestments.

### Prepayment Assumptions

To test the adequacy of the cash flows to support full and timely repayment of P&I on the rated obligations in both a slow and fast prepayment environment, Fitch assumes a slow prepayment rate of 3% CPR and a fast prepayment speed of 30% CPR. The fast prepayment speed represents a low probability/high severity assumption for stressing the negative carry impact when analyzing Canadian covered bonds.

### Servicing Fee Assumptions

In its cash flow analysis, Fitch assumes a servicing fee of 0.30%, which represents the additional potential costs that could be incurred in a higher delinquency and default stress scenario than that observed in recent performance. An additional 0.02% is added for covered bond transactions to account for the CMHC registry fee payable by the issuing banks for a total assumed servicing cost of 0.32%.

### **Default Timing Assumptions**

Fitch assumes defaults are distributed evenly for the first four years of the loan (6.25% per quarter for 16 quarters). This assumption is based on borrower behavior that showed that the majority of defaults (60 days DQ) occurred during the first four years of the loans' five-year life. The four-year projected default timing curve allows for all projected defaults to occur, even in fast prepayment and high loss scenarios.

### **Negative Spread on Cash Reinvestments**

As part of its covered bond cash flow analysis, Fitch accounts for the difference between earnings on assets held in cash and interest due on covered bond liabilities that arises from maturity mismatches between the assets and liabilities.

For programs that have a guaranteed investment contract (GIC), the negative spread assumed by Fitch will be the GIC margin that is provided for in the transaction documents. Because the GIC provider is obligated to pay the difference in excess of the margin, Fitch expects the GIC provider's Issuer Default Rating (IDR) to be consistent with that described in its criteria report "Structured Finance and Covered Bonds Counterparty Rating Criteria."

Currently, for the Canadian programs, Fitch assumes a negative spread on cash investments based on the GIC margin defined in the covered bond program documents. If there is no guaranteed GIC margin defined in the covered bond program documents, Fitch models negative 0.5%.

## **Variations from Criteria**

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. The combination of transparent criteria, analytical judgment applied on a transaction-by-transaction or issuer-by-issuer basis, and full disclosure via rating commentary strengthens Fitch's rating process while assisting market participants in understanding the analysis behind our ratings.

A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity. Such adjustments are called variations. All variations will be disclosed in the respective rating action commentaries, including their impact on the rating where appropriate.

A variation can be approved by a ratings committee where the risk, feature or other factor relevant to the assignment of a rating and the methodology applied to it are both included within the scope of the criteria, but where the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.

## **Transaction Commentary Disclosures**

Fitch may perform sensitivity analyses on the ratings assigned to debt instruments collateralized by Canadian residential mortgage pools, which primarily consist of covered bond issuances. Fitch will disclose the sensitivities and other transaction-specific adjustments, which may include the following considerations:

- Rating sensitivity to increased loan-level sMVD assumptions.
- Rating sensitivity to extended foreclosure and liquidation timeline assumptions.
- Rating sensitivity to increased MVDs for loans concentrated in a geographic region.
- For non-investment-grade, non-bank lending institutions, Fitch will evaluate renewal risk of such loan products in its analysis of the transaction and may apply assumptions outside of those described in these criteria.
- For institutions that adhere to CMHC and OSFI guidelines, adjustments may be applied by Fitch on a portfolio-wide basis to reflect variances from underwriting and origination principles set forth by OSFI, CMHC or any other regulatory agency, as well as from those considered as industry best practices for bank lenders at the time of the criteria review. A number of factors will be considered in this assessment, including, but not limited to: the general robustness of underwriting standards; origination

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practices, such as internal quality controls; valuation techniques; and underwriter experience and performance track record.

- Separate loan-level PD adjustments are applied to delinquent mortgages to account for their higher default risk. Fitch also makes adjustments the PD at the pool-level to account for risks associated with geographically concentrated pools.
- To account for portfolios with significantly higher than average regional concentrations, Fitch will apply PD adjustments to the pool to reflect this vulnerability.

### Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's ratings definitions available at <https://www.fitchratings.com/site/definitions>.

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## Appendix A: Nonbank Originations

When analyzing Canadian mortgage pools, Fitch assumes that loan origination standards are contemplative of prudent mortgage underwriting practices consistent with a lender's internal guidelines, CMHC's policies and the Office of the Superintendent of Financial Institutions' (OSFI) Guidelines B-20 and B-21.

For this reason, the criteria described herein are generally applicable to covered bond programs and Canadian RMBS transactions secured by loans originated by institutions that adhere to CMHC and OSFI's B-20 and B-21 guidelines. This is a particularly important consideration given the short-term nature of Canadian mortgages and the renewal risk faced by borrowers if their lending institution were to become insolvent. Borrowers who are underwritten to these standards are much more likely to obtain a new mortgage with a new lender, particularly if the insolvent institution is a bank and the loan was originated to OSFI guidelines.

While Fitch factors the default risk potential for borrowers who are unable to qualify for a new mortgage at renewal due to credit reasons, loans underwritten to guidelines outside of CMHC and OSFI standards may pose systemic risk to the transaction in the event of the lending institution's insolvency. Because prospective lenders may be unable or unwilling to issue a mortgage under similar terms, Fitch believes that renewal risk for such loan products may subject the transaction to very high loss expectations, or a rating cap. In certain instances, the risk may not be quantifiable.

For non-investment-grade, non-bank lending institutions, Fitch will evaluate renewal risk of such loan products in its analysis of the transaction and may apply adjustments to the portfolio to reflect this risk.

For institutions that do not adhere to CMHC and OSFI guidelines, adjustments may be applied by Fitch on a portfolio-wide basis to reflect variances from underwriting and origination principles set forth by OSFI, CMHC or any other regulatory agency, as well as from those considered as industry best practices for bank lenders at the time of the operational review. Fitch may hair-cut the appraised value or increase the TDSR.

A number of factors will be considered when determining what adjustments will be made for these institutions, including: the general robustness of underwriting standards; origination practices, such as internal quality controls; valuation techniques; and underwriter experience and performance track record.

## Appendix B: Sustainable Home Price Methodology

Fitch Ratings' Sustainable Home Price (SHP) methodology is a countercyclical approach designed to produce an equilibrium home price estimate (sustainable value) driven by macroeconomic fundamentals. The objective is to measure the extent to which home prices deviate from sustainable values. The methodology produces sustainable market value declines (sMVDs) that are used by Fitch to adjust property values and borrower equity ratios in its Canadian RMBS loan loss model.

The SHP approach does not generate a specific home price forecast. Instead, it analyzes the extent to which prices have deviated from a sustainable value supported by the income level, a broad measure of economic growth that can affect housing demand. In Fitch's rating analysis, mortgages are analyzed by comparing the loan balance to the estimated sustainable property value rather than the appraisal at origination. For an \$80,000 loan originated on a property appraised at \$100,000, but in a market considered to be 20% overvalued, Fitch would discount the appraisal property value by 20%, leaving the loan with a 100% sLTV.

Underlying Fitch's SHP methodology is the assumption that, over the long term, home prices revert to equilibrium or sustainable values based on fundamental demand conditions. The sustainable benchmark of the local housing market is estimated with the 15-year trailing average home price to income ratio from the central statistics area (CSA) of Toronto, Hamilton, Ottawa, Calgary, Edmonton, Montreal, Quebec City, Victoria and Vancouver.

For properties not in the nine CSAs mentioned below, but within the four provinces of British Columbia, Ontario, Quebec and Alberta, Fitch will use a province-level weighted average figure based on the CSAs in that province. For properties not within these four provinces, Fitch will use the national sustainable home price.

### sMVD Calculation

After the SHP approach estimates the current sustainable value in each CSA, the sustainable value is compared with actual home prices to determine whether home prices are over-valued and to assign an sMVD to the area.

Fitch's sMVD is calculated by the following equation:

$$sMVD = 1 - \left( \frac{\text{Sustainable Value}}{\text{Current Nominal Value}} \right)$$

Adjustments for sMVDs are only made for over-valuation. If a CSA is estimated to be under-valued, Fitch does not increase the current property value. Additionally, Fitch applies a minimum of a 10% sMVD in all nine CSAs due to the relatively limited historical data in Canada (including the lack of an observed significant correction) that affects the methodology's predictive ability.

### sMVDs by CSA

(MVD Assumption for Determining SHP Value)	
(%)	2021
Calgary, AB	10
Edmonton, AB	10
Vancouver, BC	23
Victoria, BC	20
Hamilton, ON	36
Ottawa, ON	24
Toronto, ON	32
Montreal, QC	19
Quebec, QC	10

Source: Fitch Ratings.

### sMVDs by Provinces

(%)	2021
Alberta	10
British Columbia	23
Ontario	32
Quebec	17

Source: Fitch Ratings.

### National sMVD

(%)	2021
Canada	23

Source: Fitch Ratings.



## Appendix C: Data Sources

### Data Source Canadian Residential Mortgage PD Regression Model

Unlike in the U.S., where loan-level data are available, there is no central repository for mortgage performance data in Canada. Fitch was able to obtain cohort-level, portfolio loan-level data from two banks as a representative sample of the Canadian mortgage market. The dataset contains loans originated from 2003–2009 with performance through 2014. The dataset includes the lifetime (five years life) default rate by percentage of loan count.

Fitch defines default as a loan 60 or more days delinquent at least once through its life, primarily due to the absence of significant historical stress in the Canadian market, which would provide for a sufficiently sized database of full defaults. Fitch excluded roughly 325,000 loans in total, either due to missing data or insufficient performance history. The cohort data are transformed to 960,000 loan-level records. The default model is built based on the regression of six loan attributes (LTV, FICO, TDSR, property type, loan purpose and loan occupancy status).

Fitch requests loan-level collateral information at issuance and on a quarterly basis (data may be requested at other times as needed), such as original and current combined LTV ratios, borrower credit score and TDSR, among other attributes, to enable it to assess the credit quality of a mortgage loan portfolio. In addition, Fitch will request the following historical mortgage performance information from each originator/issuer:

- Loan-level or aggregate static arrears data and/or default data by origination vintage.
- Loss or recovery data (e.g. loan- or aggregate-level information on foreclosed properties).
- Prepayment data (e.g. dynamic voluntary prepayments).

Loan-level data provided by the issuer will be the input into the mortgage loss model to derive an expected loss for the mortgage pool. The agency may apply conservative adjustments to account for any insufficiencies in the quality or quantity of the data provided or performances that deviate from the assumptions on which the agency's default model is calibrated. In addition, Fitch may apply a rating cap or decide not to assign a rating if there are material limitations in the data received.

Fitch requests that data be at a sufficiently granular level to enable it to reach specific conclusions regarding the portfolio being analyzed. Fitch assesses the robustness and accuracy of the available data before including such information in its analysis. Fitch considers, among other factors, whether the historical data are sufficient for a comparison with the loss model results. Where data are limited, Fitch may consider proxy or supplementary information to derive its assumptions.

For missing values from data tapes, the model applies default values to step and non-step loans as follows:

- a. 680 credit score;
- b. 45% TDSR;
- c. non-single family for property type;
- d. investor for occupancy; and
- e. purchase for purpose.

### Data Source Canadian RMBS Sustainable Home Price Approach

The SHP methodology relies on home price and median income data available from 1999, sourced from Teranet and Statistics Canada.

## **Data Source Operational Risk**

In issuing and maintaining its ratings, Fitch relies on the accuracy of the factual information received from the transaction parties and other sources it considers credible. Fitch conducts a reasonable investigation of the factual information relied on by it in accordance with the agency's ratings methodology. In addition, Fitch looks to the Annual Compliance Certificate provided by each issuer as required by the Canadian Mortgage and Housing Corp. (CMHC) covered bond registry stating that the program complies with the standards contained in the Canadian Registered Covered Bond Programs Guide and all laws, rules and regulations. Fitch also conducts an operational review of the issuing bank on a yearly basis.

## **Appendix D: Data Adequacy**

The application of Fitch's Canadian RMBS Loan Loss Model relies on loan-level data provided by the issuer at issuance and on a quarterly basis. The loan-level data are compared to the loan-level stratification data provided by the issuer. In addition, Fitch reviews the key collateral attributes of the cover pool on a quarterly basis to monitor for data robustness and changes to collateral characteristics.

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