

Rating Transitions & Cumulative Default Rates - 2018

JCR-VIS Credit Rating Co. Ltd.

- Rating Transition & Cumulative Default Rate Study uses data from JCR-VIS rating database;
- Rating Transition and Cumulative Default Rate Study are based on last 10 Static Pools that include ratings conducted from January 1, 2007 to December 31, 2018;
- Only 'Medium to Long term' ratings on JCR-VIS' Issue/Issuer Rating Scale are used;
- Ratings at Issuer level are used; In case of multiple instrument ratings by an issuer, long term instrument rating taken as the issuer's rating. In case of subordinated or other structures, rating of the senior most debt is taken.
- Ratings of Structured Obligations and Insurer Financial Strength (IFS) ratings are not included in both studies due to limited number and non-comparability respectively;
- Cumulative Transition and Default Rates are expressed in Percentage Terms
- The above methodology is consistent with the methodology proposed to be implemented at the level of ACRAA.

DETAILS OF DATA SETS

- Rating Transitions are calculated for Periods: 1 year, 2 years, 3 years and 5 years since Jan. 1, 2007;
- Rating Transitions are calculated for All Rating Categories including Modifier Levels (+/-);
- Groups of all Outstanding Ratings at the Beginning of Each Period are formed;
- These Groups are called Static Pools or Cohorts;
- Rating Transitions Matrix for Each Period is developed using Static Pool Method;
- Ratings at the Beginning-of-the-period are displayed on the Y (Vertical) Axis of the Matrix;
- An Accumulated Migration Percentage of Rating Category at the End-of-the-period is depicted on the X (Horizontal) Axis;

RATING TRANSITIONS DEFINITION

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
5 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA+	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 AA	22.2	-	77.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 AA-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 A+	-	-	-	20.0	60.0	20.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14 A	-	-	-	-	-	78.6	7.1	-	-	-	-	-	-	-	-	-	-	-	-	14.3
18 A-	-	-	-	-	-	-	66.7	16.7	-	-	-	-	-	-	-	-	-	-	5.6	11.1
7 BBB+	-	-	-	-	-	-	28.6	57.1	-	-	-	-	-	-	-	-	-	14.3	-	-
10 BBB	-	-	-	-	-	-	-	10.0	70.0	-	-	10.0	-	-	-	-	-	-	-	10.0
2 BBB-	-	-	-	-	-	-	-	-	50.0	50.0	-	-	-	-	-	-	-	-	-	-
0 BB+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0

RATING TRANSITIONS 2010

Counts	End-of-Period Rating																				
		AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
Beginning-of-Period Rating	7 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4 AA+	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7 AA	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7 AA-	-	-	-	85.7	14.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3 A+	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10 A	-	-	-	-	30.0	60.0	-	-	-	-	-	10.0	-	-	-	-	-	-	-	-
	7 A-	-	-	-	-	-	42.9	57.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	6 BBB+	-	-	-	-	-	16.7	-	66.7	16.7	-	-	-	-	-	-	-	-	-	-	-
	8 BBB	-	-	-	-	-	-	-	25.0	62.5	-	-	-	-	-	-	-	-	-	-	12.5
	1 BBB-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-
	0 BB+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1 BB	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
	1 BB-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
	0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS

2011

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
6 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA+	25.0	50.0	25.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 AA	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 AA-	-	-	16.7	83.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A+	-	-	-	11.1	77.8	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 A	-	-	-	-	-	81.8	18.2	-	-	-	-	-	-	-	-	-	-	-	-	-
4 A-	-	-	-	-	-	50.0	50.0	-	-	-	-	-	-	-	-	-	-	-	-	-
4 BBB+	-	-	-	-	-	-	25.0	50.0	-	-	-	-	-	-	-	-	-	-	-	25.0
5 BBB	-	-	-	-	-	-	-	-	60.0	40.0	-	-	-	-	-	-	-	-	-	-
0 BBB-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB+	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS 2012

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
6 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA+	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 AA	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 AA-	-	-	16.7	83.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 A+	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16 A	-	-	-	-	31.3	68.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-
5 BBB+	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-
2 BBB	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-
2 BBB-	-	-	-	-	-	-	-	50.0	-	50.0	-	-	-	-	-	-	-	-	-	-
1 BB+	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
1 B+	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS 2013

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
4 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA+	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA	-	25.0	75.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 AA-	-	-	33.3	66.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 A+	-	-	33.3	-	58.3	-	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-
10 A	10.0	-	-	-	20.0	60.0	10.0	-	-	-	-	-	-	-	-	-	-	-	-	-
7 A-	-	-	-	-	14.3	14.3	71.4	-	-	-	-	-	-	-	-	-	-	-	-	-
8 BBB+	-	-	-	-	-	-	62.5	37.5	-	-	-	-	-	-	-	-	-	-	-	-
1 BBB	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-
0 BBB-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB+	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS 2014

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
4 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA+	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 AA	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 AA-	-	-	20.0	80.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A+	-	-	-	-	88.9	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A	-	-	-	-	11.1	77.8	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-
12 A-	-	-	-	-	-	-	83.3	8.3	-	8.3	-	-	-	-	-	-	-	-	-	-
4 BBB+	-	-	-	-	-	-	-	75.0	-	-	25.0	-	-	-	-	-	-	-	-	-
3 BBB	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-
0 BBB-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB+	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS 2015

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
5 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 AA+	20.0	80.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 AA	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 AA-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A+	-	-	-	-	77.8	11.1	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A	-	-	-	-	22.2	44.4	22.2	11.1	-	-	-	-	-	-	-	-	-	-	-	-
10 A-	-	-	-	-	-	30.0	70.0	-	-	-	-	-	-	-	-	-	-	-	-	-
4 BBB+	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-
2 BBB	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-
0 BBB-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 BB+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 BB-	-	-	-	-	-	-	-	-	-	-	-	-	50.0	-	50.0	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS

2016

Counts	End-of-Period Rating																			
	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
6 AAA	83.3	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 AA+	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 AA	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 AA-	-	-	12.5	87.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 A+	-	-	-	22.2	77.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 A	-	-	-	-	14.3	85.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 A-	-	-	-	-	-	25.0	75.0	-	-	-	-	-	-	-	-	-	-	-	-	-
3 BBB+	-	-	-	-	-	-	33.3	33.3	33.3	-	-	-	-	-	-	-	-	-	-	-
2 BBB	-	-	-	-	-	-	-	50.0	50.0	-	-	-	-	-	-	-	-	-	-	-
0 BBB-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 BB+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS

2017

Beginning-of-Period Rating	Counts	End-of-Period Rating																		
		AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C
7 AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 AA+	14.3	85.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 AA	-	20.0	80.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 AA-	-	-	14.3	85.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13 A+	-	-	-	-	92.3	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 A	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 A-	-	-	-	-	-	8.3	83.3	-	-	8.3	-	-	-	-	-	-	-	-	-	-
5 BBB+	-	-	-	-	-	-	20.0	80.0	-	-	-	-	-	-	-	-	-	-	-	-
2 BBB	-	-	-	-	-	-	-	-	50.0	50.0	-	-	-	-	-	-	-	-	-	-
1 BBB-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
1 BB+	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-
0 BB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 BB-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
0 B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RATING TRANSITIONS

2018

Year	Upgrades	Downgrades	No Change
2010	8	23	94
2011	17	8	73
2012	13	14	85
2013	17	1	79
2014	24	5	75
2015	4	7	94
2016	8	7	56
2017	11	4	84
2018	15	8	142

**RATING
ACTIONS**

	End-of-Period Rating																				
	%	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
AAA	98.4	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AA+	6.1	91.8	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AA	2.8	2.8	94.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AA-	-	-	9.4	87.5	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A+	-	-	4.4	5.6	81.1	6.7	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A	-	-	-	-	11.3	77.4	7.3	1.6	-	-	-	0.8	-	-	-	-	-	-	-	-	1.6
A-	-	-	-	-	1.6	11.1	76.2	4.0	0.8	3.2	-	-	-	-	-	-	-	0.8	-	0.8	1.6
BBB+	-	-	-	-	-	1.7	22.0	62.7	6.8	1.7	1.7	-	-	-	-	-	-	-	1.7	-	1.7
BBB	-	-	-	-	-	-	2.2	8.9	71.1	8.9	-	2.2	-	-	-	-	-	-	-	-	6.7
BBB-	-	-	-	-	-	-	-	11.1	22.2	33.3	33.3	-	-	-	-	-	-	-	-	-	-
BB+	-	-	-	-	-	-	-	12.5	-	12.5	50.0	-	25.0	-	-	-	-	-	-	-	-
BB	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-
BB-	-	-	-	-	-	-	-	-	-	-	10.0	-	80.0	-	10.0	-	-	-	-	-	-
B+	-	-	-	-	-	50.0	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-
B	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0

CUMULATIVE
1 YEAR
RATING
TRANSITIONS

	%	End-of-Period Rating																			
		AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
Beginning-of-Period Rating	AAA	98.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AA+	10.0	85.0	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AA	5.0	5.0	90.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AA-	-	-	20.8	73.6	5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	A+	-	-	4.4	13.2	64.7	10.3	2.9	-	-	1.5	-	1.5	-	-	-	-	-	-	1.5	
	A	-	-	-	1.0	24.0	57.0	12.0	4.0	1.0	-	-	-	-	-	-	-	-	1.0	-	
	A-	-	-	-	-	2.9	24.3	59.2	5.8	1.0	2.9	-	-	-	-	-	-	-	-	1.0	2.9
	BBB+	-	-	-	-	-	2.0	33.3	51.0	5.9	3.9	-	2.0	-	-	-	-	-	-	-	2.0
	BBB	-	-	-	-	-	-	2.4	12.2	65.9	4.9	4.9	-	2.4	-	-	-	2.4	-	-	4.9
	BBB-	-	-	-	-	-	-	11.1	11.1	44.4	22.2	11.1	-	-	-	-	-	-	-	-	-
	BB+	-	-	-	-	-	-	11.1	11.1	-	-	11.1	-	44.4	-	11.1	-	11.1	-	-	-
	BB	-	-	-	-	-	-	-	-	-	-	33.3	33.3	33.3	-	-	-	-	-	-	-
	BB-	-	-	-	-	-	-	-	-	-	-	25.0	-	75.0	-	-	-	-	-	-	-
	B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-
CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

CUMULATIVE
2 YEARS
RATING
TRANSITIONS

	%	End-of-Period Rating																			
		AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
Beginning-of-Period Rating	AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AA+	16.7	77.8	5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AA	8.9	6.7	84.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AA-	-	-	28.6	64.3	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	A+	-	-	5.8	19.2	51.9	17.3	-	-	-	1.9	-	1.9	-	-	-	-	-	-	-	1.9
	A	-	-	-	2.4	36.5	41.2	8.2	3.5	-	1.2	1.2	1.2	-	-	-	-	-	1.2	-	3.5
	A-	-	-	-	-	6.4	33.3	51.3	3.8	1.3	1.3	-	-	-	-	-	-	-	-	1.3	1.3
	BBB+	-	-	-	-	-	7.0	37.2	41.9	9.3	-	2.3	-	2.3	-	-	-	-	-	-	-
	BBB	-	-	-	-	-	-	5.7	22.9	51.4	8.6	5.7	-	2.9	-	-	-	-	-	-	2.9
	BBB-	-	-	-	-	-	-	20.0	20.0	40.0	-	-	-	20.0	-	-	-	-	-	-	-
	BB+	-	-	-	-	-	-	40.0	-	-	-	20.0	-	20.0	-	20.0	-	-	-	-	-
	BB	-	-	-	-	-	-	-	-	-	50.0	-	-	50.0	-	-	-	-	-	-	-
	BB-	-	-	-	-	-	-	-	14.3	-	-	14.3	-	71.4	-	-	-	-	-	-	-
	B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CUMULATIVE
3 YEARS
RATING
TRANSITIONS

		End-of-Period Rating																			
%		AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	C	D
Beginning-of-Period Rating	AAA	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AA+	25.9	66.7	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AA	5.3	15.8	78.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AA-	-	-	43.5	47.8	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A+	-	-	22.6	9.7	41.9	19.4	-	3.2	-	-	-	3.2	-	-	-	-	-	-	-	-
	A	-	-	1.9	9.3	48.1	25.9	11.1	3.7	-	-	-	-	-	-	-	-	-	-	-	-
	A-	-	-	-	1.8	18.2	30.9	40.0	-	-	3.6	3.6	-	-	-	-	-	-	-	-	1.8
	BBB+	-	-	-	-	-	21.2	42.4	24.2	6.1	-	-	-	6.1	-	-	-	-	-	-	-
	BBB	-	-	-	-	-	-	26.3	21.1	31.6	5.3	5.3	-	5.3	-	5.3	-	-	-	-	-
	BBB-	-	-	-	-	-	16.7	16.7	16.7	50.0	-	-	-	-	-	-	-	-	-	-	-
	BB+	-	-	-	-	-	-	50.0	25.0	-	-	25.0	-	-	-	-	-	-	-	-	-
	BB	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
	BB-	-	-	-	-	-	-	40.0	-	-	-	-	-	60.0	-	-	-	-	-	-	-
	B+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CCC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CUMULATIVE
5 YEARS
RATING
TRANSITIONS

- Failure of an obligor to make timely payment of principal and/or interest under contractual terms of any financial obligation.
- A distressed restructuring whereby
 - lenders have diminished financial returns relative to the original obligation; and
 - the restructuring has the effect of allowing the obligor to avoid a bankruptcy or payment default.

Default is generally recognized after the expiry of grace period.

However, if JCR-VIS believes that the requisite payment will not be made in full by the due date (including the pre-specified grace period), then default may be recognized immediately.

DEFINITION OF DEFAULT

- Groups of all Outstanding Ratings at the Beginning of Each Period are formed;
- These Groups are called Static Pools or Cohorts;
- Changes in a particular Static Pool are then Tracked till the End-of-the-period;
- Adjustment for Withdrawn or Discontinued Ratings: All such ratings which do not continue to Exist till the End-of-the-period are Excluded at the time of Static Pool Formation;
- New ratings that are conducted during the period of a Static Pool are included in Static Pools of subsequent Periods;
- Insurer Financial Strength (IFS) Ratings are not included.

DETAILS
OF CDR
STATIC POOLS

- Three-years Weighted Average Cumulative Default Rates (CDRs) are calculated using Static Pools of 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015 and 2016;
- Calculation Steps:
 - Create Withdrawal-adjusted Static Pools and Survivor Rate for each Period
 - Calculate Marginal Default Rates (MDRs) for each Period for every Static Pool separately;
 - Calculate Weighted Average of each MDR (wMDR) weighted for Size of each Static Pool
 - Calculate $CDR = 1 - [(1-WMDR1)*(1-WMDR2)*(1-WMDR3)]$

CUMULATIVE DEFAULT RATES

CATEGORY LEVEL	As at December 31		
	2016	2017	2018
3-years Cumulative Default Rate (CDR3)			
AAA	0.0%	0.0%	0.0%
AA	0.0%	0.0%	0.0%
A	5.2%	4.7%	4.2%
BBB	5.5%	5.2%	4.9%
Investment Grade (AAA to BBB)	4.2%	3.8%	3.5%
BB	2.0%	1.9%	1.8%
B	0.0%	0.0%	0.0%
CCC	0.0%	0.0%	0.0%
CC	0.0%	0.0%	0.0%
C	42.1%	42.1%	42.1%

CUMULATIVE
DEFAULT
RATES

Static Pools

	2014		2015		2016	
	Ratings ¹	Withdrawals ²	Ratings ¹	Withdrawals ²	Ratings ¹	Withdrawals ²
AAA	7	4	6	3	5	0
AA	13	7	17	4	16	3
A	32	8	38	9	41	8
BBB	13	3	11	2	12	1
Investment Grade (AAA-BBB)	65	22	72	18	74	12
BB	3	1	2	1	8	5
B	0	0	0	0	0	0
CCC	0	0	0	0	0	0
CC	0	0	0	0	0	0
C	0	0	0	0	0	0
Total	68	23	74	19	82	17

Notes:

1. Number of ratings outstanding at the beginning of each year
2. Number of rating withdrawals in the next 3 years

CDR
DATA COUNTS