

Rating Transitions & Cumulative Default Rates - 2017

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 include ratings conducted from January 1, 2007 to December 31, 2017;
- 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 are not included in both studies due to limited number of ratings;
- 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 (+/-);
- 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 |
| 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

| 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 |

**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 | |
| Beginning-of-Period Rating | AAA | 98.1 | 1.9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA+ | 4.8 | 92.9 | 2.4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA | 3.0 | 1.5 | 95.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA- | - | - | 8.8 | 87.7 | 3.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | A+ | - | - | 5.2 | 6.5 | 79.2 | 6.5 | 2.6 | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | A | - | - | - | - | 12.4 | 75.2 | 8.0 | 1.8 | - | - | - | 0.9 | - | - | - | - | - | - | - | - | 1.8 |
| | A- | - | - | - | - | 1.7 | 11.3 | 74.8 | 5.2 | 0.9 | 2.6 | - | - | - | - | - | - | 0.9 | - | 0.9 | 1.7 | |
| | BBB+ | - | - | - | - | - | 1.9 | 22.2 | 61.1 | 7.4 | 1.9 | 1.9 | - | - | - | - | - | - | 1.9 | - | - | 1.9 |
| | BBB | - | - | - | - | - | - | 2.3 | 9.3 | 72.1 | 7.0 | - | 2.3 | - | - | - | - | - | - | - | - | 7.0 |
| | BBB- | - | - | - | - | - | - | - | 12.5 | 25.0 | 37.5 | 25.0 | - | - | - | - | - | - | - | - | - | - |
| | BB+ | - | - | - | - | - | - | - | 14.3 | - | - | 57.1 | - | 28.6 | - | - | - | - | - | - | - | - |
| | BB | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - |
| | BB- | - | - | - | - | - | - | - | - | - | - | 11.1 | - | 77.8 | - | 11.1 | - | - | - | - | - | - |
| | B+ | - | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - |
| | B | - | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - |
| | CCC | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 |

CUMULATIVE
1 YEAR
RATING
TRANSITIONS

| | | End-of-Period Rating | | | | | | | | | | | | | | | | | | | |
|----------------------------|------|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----|-------|---|----|-------|-----|-----|-----|
| Beginning-of-Period Rating | % | AAA | AA+ | AA | AA- | A+ | A | A- | BBB+ | BBB | BBB- | BB+ | BB | BB- | B+ | B | B- | CCC | CC | C | D |
| | AAA | 95.5 | 2.3 | - | - | - | 2.3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| AA+ | 11.1 | 83.3 | 5.6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| AA | 5.8 | 3.8 | 90.4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| AA- | - | - | 19.1 | 74.5 | 6.4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| A+ | - | - | 5.1 | 13.6 | 61.0 | 11.9 | 3.4 | - | - | 1.7 | - | 1.7 | - | - | - | - | - | - | - | - | 1.7 |
| A | 1.1 | - | - | 1.1 | 24.2 | 54.7 | 12.6 | 4.2 | 1.1 | - | - | - | - | - | - | - | - | - | 1.1 | - | - |
| A- | - | - | - | - | 3.4 | 22.5 | 59.6 | 6.7 | 1.1 | 2.2 | - | - | - | - | - | - | - | - | - | 1.1 | 3.4 |
| BBB+ | - | - | - | - | - | 2.0 | 32.7 | 51.0 | 6.1 | 4.1 | - | 2.0 | - | - | - | - | - | - | - | - | 2.0 |
| BBB | - | - | - | - | - | - | 2.6 | 13.2 | 65.8 | 5.3 | 2.6 | - | 2.6 | - | - | - | - | 2.6 | - | - | 5.3 |
| BBB- | - | - | - | - | - | - | 12.5 | 12.5 | 50.0 | 12.5 | 12.5 | - | - | - | - | - | - | - | - | - | - |
| BB+ | - | - | - | - | - | - | 11.1 | 11.1 | - | - | 11.1 | - | 44.4 | - | 11.1 | - | - | 11.1 | - | - | - |
| BB | - | - | - | - | - | - | - | - | - | - | 33.3 | 33.3 | 33.3 | - | - | - | - | - | - | - | - |
| BB- | - | - | - | - | - | - | - | - | - | - | 28.6 | - | 71.4 | - | - | - | - | - | - | - | - |
| 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 | 97.1 | - | - | - | - | 2.9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA+ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA | 66.7 | 33.3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA- | - | - | - | 100.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | A+ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | A | 2.0 | - | - | 3.9 | - | 62.7 | 13.7 | 5.9 | - | - | 2.0 | 2.0 | - | - | - | - | - | 2.0 | - | 5.9 | - | |
| | A- | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | BBB+ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | BBB | - | - | - | - | - | - | - | - | 81.0 | 9.5 | 4.8 | - | - | - | - | - | - | - | - | - | 4.8 | - |
| | BBB- | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - | - |
| | BB+ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | BB | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - | - |
| | BB- | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 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 | 95.5 | - | - | - | - | 4.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA+ | 26.1 | 65.2 | 8.7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA | 6.7 | 6.7 | 86.7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | AA- | - | - | 40.0 | 50.0 | 10.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| | A+ | - | - | 17.4 | 13.0 | 34.8 | 26.1 | - | 4.3 | - | - | - | 4.3 | - | - | - | - | - | - | - | - | |
| | A | - | - | 2.1 | 8.5 | 46.8 | 25.5 | 12.8 | 4.3 | - | - | - | - | - | - | - | - | - | - | - | - | |
| | A- | - | - | - | 2.0 | 20.4 | 32.7 | 36.7 | - | - | 2.0 | 4.1 | - | - | - | - | - | - | - | - | - | 2.0 |
| | BBB+ | - | - | - | - | - | 14.8 | 40.7 | 29.6 | 7.4 | - | - | - | 7.4 | - | - | - | - | - | - | - | - |
| | BBB | - | - | - | - | - | - | 27.8 | 22.2 | 33.3 | 5.6 | - | - | 5.6 | - | 5.6 | - | - | - | - | - | - |
| | BBB- | - | - | - | - | - | 16.7 | 16.7 | 16.7 | 50.0 | - | - | - | - | - | - | - | - | - | - | - | - |
| | BB+ | - | - | - | - | - | - | 50.0 | 25.0 | - | - | 25.0 | - | - | - | - | - | - | - | - | - | - |
| | BB | - | - | - | - | - | - | - | - | - | - | - | - | 100.0 | - | - | - | - | - | - | - | - |
| | BB- | - | - | - | - | - | - | 50.0 | - | - | - | - | - | 50.0 | - | - | - | - | - | - | - | - |
| | 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 STATIC POOLS

- Three-years Weighted Average Cumulative Default Rates (CDRs) are calculated using Static Pools of 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014 and 2015;
- 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 | | |
|---|-------------------|-------------|-------------|
| | 2015 | 2016 | 2017 |
| 3-years Cumulative Default Rate (CDR3) | | | |
| AAA | 0.0% | 0.0% | 0.0% |
| AA | 0.0% | 0.0% | 0.0% |
| A | 8.2% | 5.2% | 4.7% |
| BBB | 8.4% | 5.5% | 5.2% |
| Investment Grade (AAA to BBB) | 6.1% | 4.2% | 3.8% |
| BB | 13.8% | 2.0% | 1.9% |
| B | 0.0% | 0.0% | 0.0% |
| CCC | 0.0% | 0.0% | 0.0% |
| CC | 0.0% | 0.0% | 0.0% |
| C | 77.8% | 42.1% | 42.1% |

CUMULATIVE
DEFAULT
RATES

Static Pools

| | 2013 | | 2014 | | 2015 | |
|-----------------------------------|----------------------|--------------------------|----------------------|--------------------------|----------------------|--------------------------|
| | Ratings ¹ | Withdrawals ² | Ratings ¹ | Withdrawals ² | Ratings ¹ | Withdrawals ² |
| AAA | 6 | 4 | 7 | 4 | 6 | 3 |
| AA | 14 | 7 | 13 | 7 | 17 | 4 |
| A | 36 | 7 | 32 | 8 | 38 | 9 |
| BBB | 17 | 4 | 13 | 3 | 11 | 2 |
| Investment Grade (AAA-BBB) | 73 | 22 | 65 | 22 | 72 | 18 |
| BB | 2 | 0 | 3 | 1 | 2 | 1 |
| B | 1 | 1 | 0 | 0 | 0 | 0 |
| CCC | 1 | 1 | 0 | 0 | 0 | 0 |
| CC | 0 | 0 | 0 | 0 | 0 | 0 |
| C | 1 | 0 | 0 | 0 | 0 | 0 |
| Total | 78 | 24 | 68 | 23 | 74 | 19 |

Notes:

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

CUMULATIVE
DEFAULT
RATES
DATA COUNTS