CRISIL
An S&P Global Company

CRISIL Ratings

Default and rating transition study

Up to fiscal 2021

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Default rates - meaning and significance

What are default rates?

Default rate is the number of defaults among rated firms during a specified period, expressed as a percentage of the total number of firms with outstanding ratings. Default rates are calculated for each rating category and over multiple periods.

What are transition rates?

Transition rate indicates the number of instances when credit ratings among rated firms have changed over a specified period, expressed as a percentage of the total number of firms with outstanding ratings. Transition rates are calculated for the entire rated population or for a specified rating category.

How are default and transition rates used?

Accurate and reliable default and transition rates are critical inputs for all debt market participants for:

a. Pricing debt

Default and transition rates are critical inputs in pricing debt instruments or loan exposures. Default probabilities associated with ratings help investors and lenders quantify the credit risk in their debt exposures, and provide inputs on whether and how much to lend, and at what price.

b. Structuring and pricing credit-enhanced instruments

The structuring, rating and pricing of credit-enhanced instruments depend heavily on the default and transition rates of the underlying borrowers and securities.

c. Measuring credit risk

Default and transition rates are key inputs in many quantitative risk assessment models. Investors in rated instruments can manage their risk exposures effectively if they have access to reliable default and transition rates. Transition rates are also important for debt funds that need to maintain a certain threshold of credit quality in their portfolios, and for investors who are, because of regulations or otherwise, mandated to invest only in securities that are rated at or above a certain level.

d. Indicating efficacy of the rating scale

CRISIL's credit ratings indicate probability of default. If ratings are reliable, the default rates should reduce as one moves up the rating scale. Default and transition rates may, therefore, be used to validate rating scales and quantify rating stability.

Key variables in default rate computation

i. Definition of default

A clear definition of default is necessary for computing default rates. CRISIL Ratings defines default as any missed payment on a rated instrument. Thus, if a rated debt obligation is not serviced in full by the due date, it moves to 'CRISIL D' or an equivalent rating. Furthermore, as credit ratings are an opinion on the likelihood of timely repayment of debt, any post-default recovery is not factored into the ratings. CRISIL Ratings believes that such an objective definition of default and its consistent application over time provide a strong foundation for the meaningful third-party use of its default rates. Thus, the **default rates of CRISIL Ratings are free from default-recognition bias.**

ii. Period of computation

Default rates may be computed over varying time frames, potentially exposing such computation to period-selection bias. For example, if default rates were published over a period of economic strength, they would appear to be artificially low, and hence, would be of limited use to market participants. CRISIL Ratings has published its default rates computed over the past 10 fiscals, which are representative of the prevailing credit environment. CRISIL Ratings also publishes default rates from inception to date, ensuring that they are **free from period-selection bias.**

iii. Computation methodology

Default rates may be computed using several methodologies. Each has implications for the numeric outcome as explained in Table A20. CRISIL Ratings computes default rates using the Average Cumulative Default Rate approach and the weighted marginal default rate methodology, with full-year withdrawal adjustments as explained in Annexure 10.

A 'normalisation' of the variables must precede any comparison of default statistics across credit rating agencies (CRAs).

Preface

The uniqueness of CRISIL Ratings default and ratings transition study

The default and ratings transition study of CRISIL Ratings incorporates global best practices in the computation of default rates. These include a digital definition of default, elimination of period-selection bias, application of the globally accepted marginal default rate method, and use of monthly frequency static pools as base data. CRISIL Ratings is the first rating agency in India to use monthly static pools in computing default and transition rates. This rigorous method amplifies the ability to capture defaults and rating changes that have occurred during the year.

Moreover, the default and transition statistics of CRISIL Ratings adequately represent the default characteristics of companies across sectors and industries. This study presents the default and transition statistics for the past 10 fiscals to focus on the more recent rating performance. This addresses the view of many investors and policymakers that the huge surge in default rates in the late 1990s was because of structural changes in the Indian economy and is unlikely to recur, and hence, default rates in recent years would be more representative of the prevailing credit environment.

Nevertheless, the study also includes the performance of ratings assigned by CRISIL Ratings since its inception in 1987. The data set is the largest and the most comprehensive in the Indian debt market as it takes into account more than one full economic cycle.

CRISIL Ratings believes it is important to present default rates for the recent period as well as since inception to help stakeholders form an opinion on the default behaviour of the ratings and make better informed decisions, especially in the unprecedented situation wrought by the Covid-19 pandemic.

In computing default and transition rates for this study, all non-cooperative issuers (whose ratings carry a suffix of 'Issuer not cooperating') were removed from the static pools in the subsequent months-similar to the treatment of withdrawn ratings except the ones that have defaulted, which are retained in the static pools formed till the month these turned non cooperative. This is because such ratings lack a forward-looking perspective as they are arrived at without any management interaction, and are based on best available, limited or dated information about the firm.

If a firm defaults after it is classified as 'issuer not cooperating', it is treated as a default from its last cooperative rating. This is the most prudent approach and ensures that default rates are accurate and reliable *(see Annexure 10 for details on treatment of non-cooperative issuers for computing the default statistics).*

Executive summary

The overall annual default rate for firms rated by CRISIL Ratings was 2.0% in fiscal 2021, with 116[1] defaults during the fiscal. Despite the Covid-19 pandemic gripping the world, the overall default rate dropped significantly from 4.5% in fiscal 2020, largely because of regulatory measures and partly on account of the changing portfolio distribution with the median rating gradually moving up.

Various relief measures such as the moratorium on debt servicing and deferment of asset classification norms by the Reserve Bank of India (RBI), it's Targeted Long-Term Repo Operations (TLTRO), and government measures such as the Emergency Credit Line Guarantee scheme were timely interventions that cushioned firms facing cash-flow pressures. The relaxation of default recognition norms by the Securities and Exchange Board of India (SEBI) also played its part in providing temporary relief at the peak of the first wave of the pandemic.

Of close to 8,000 cooperative issuers with outstanding ratings from CRISIL Ratings as of March 2021, 56% had ratings in the 'CRISIL BB' category or lower. Since fiscal 2016, the median rating has moved up but remained within the 'CRISIL BB' category, not so much due to rating actions by CRISIL Ratings but because of the portfolio shrinking at the lower end of the rating spectrum - a phenomenon seen across the rating industry in India. This is because several banks have increased the threshold of minimum exposure that requires an external credit rating in recent years, leading to withdrawal of ratings or more commonly non-cooperation in the rating process by rated entities, especially in the sub-investment grade categories. It must be noted that the change in the portfolio distribution is not reflective of any similar change in the loan portfolios of banks. On the contrary, with entities earlier rated in sub-investment grade categories moving out of the external rating system while continuing in the portfolios of banks as unrated, this may unwittingly lead to lower risk weights than warranted and, in turn, to undercapitalisation of banks in comparison to the actual credit risk on their books.

The overall default rate is likely to rise going forward as the pandemic-induced regulatory measures are time-bound, even as some measures from the first wave of Covid-19 in fiscal 2021 have been extended during the second wave in fiscal 2022. The changing portfolio mix, on the other hand, is likely to exert downward pressure on the default rate.

Other highlights

- The average default rates for the 'CRISIL BBB' and above rating categories broadly declined for the period from fiscals 2011 to 2021 in comparison with the period from fiscals 2010 to 2020.
- The average default rates of CRISIL Ratings continue to exhibit ordinality across rating categories, that is, the higher rating categories have lower default rates.
- No long-term instrument rated 'CRISIL AAA' has ever defaulted in one-, two- or three-year periods.
- The stability rates of long-term ratings have continued to strengthen over the years with investment grade stability rates consistently exceeding 90%.
- The stability rates for short-term ratings remain strong across rating categories.

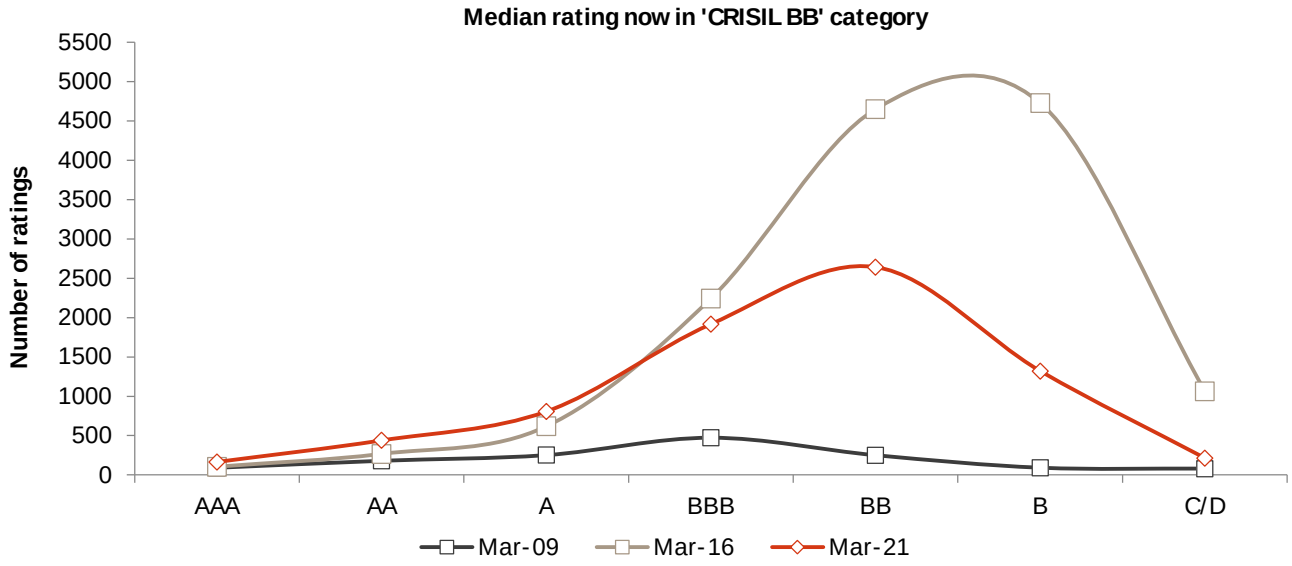
[1] This refers to number of defaults from active ratings outstanding at the beginning of fiscal. If we include instances of defaults for 1) issuers with new ratings assigned during the fiscal or 2) issuers that were non-cooperative at the beginning of fiscal and turned cooperative during the year, the defaults tally would stand at 122.

I. Rating distribution

CRISIL Ratings had outstanding long-term ratings on close to 8,000 cooperative issuers as on March 31, 2021, up from almost 1,400 as on March 31, 2009. Nearly 56% of the ratings were in the 'CRISIL BB' category or lower as of March 2021. Consequently, the rating distribution has altered significantly, with the median rating moving to the 'CRISIL BB' category as of March 2021 from 'CRISIL BBB' as of March 2009 (*see Chart 1*).

Since fiscal 2016, the outstanding ratings on cooperative issuers have declined with higher incidence of non-cooperation, especially in the sub-investment grade rating categories. The median rating has thereby moved up while continuing within the 'CRISIL BB' category.

Chart 1: Shift in the rating distribution of CRISIL Ratings



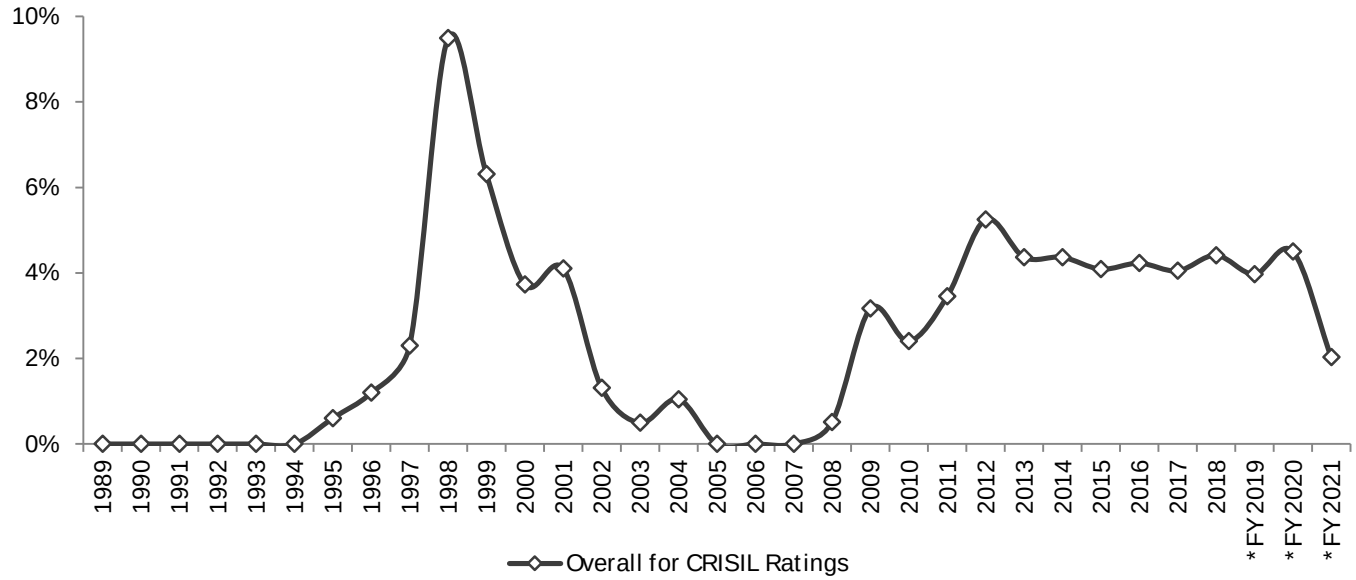
Source: CRISIL Ratings

II. Annual default rate of CRISIL Ratings since inception

Annual default rates for corporate issuers[2]

Default rates have to be both low and stable over a given period to be usefully factored into debt pricing. Chart 2 indicates the trend for the annual default rates of CRISIL Ratings (the proportion of defaults in long-term ratings to outstanding non-default long-term ratings during a year).

Chart 2: Annual default rates in the past decade



There has been a change in reporting of default statistics by CRISIL Ratings from the calendar year to the fiscal, and the default rates from 2019 are on fiscal basis. Refer CRISIL Default Study FY 2020 for a detailed comparison of the previous and current methodologies.

Source: CRISIL Ratings

[2] The term 'corporate issuers' has been used generically to include public and private limited companies, societies, trusts, and partnership and proprietorship firms, across the manufacturing, financial and infrastructure sectors, that have availed of long-term ratings from CRISIL Ratings.

III. Default rates of corporate issuers

One-, two- and three-year cumulative default rates (CDRs)

Credit ratings are opinions on the risk of default: the higher the rating, the lower the probability of default should be. An inverse correlation between credit ratings and default probability – called the test of ordinality – is desirable for CRAs. Table 1 shows the one-, two- and three-year withdrawal-adjusted CDRs of CRISIL Ratings across rating categories from fiscals 2011 to 2021 (*see Annexure 10 for methodology used in the calculation of default rates*). The default rates of CRISIL Ratings continue to be ordinal. The average default rates from fiscals 1989 to 2021, indicating rating behaviour over a prolonged period, were also ordinal. Notably, not a single instrument rated 'CRISIL AAA' has ever defaulted in one-, two- or three-year periods. (*see Table A5, Annexure 3; for default rates based on the annual static pools methodology, see Tables A6 and A7, Annexure 3)*

Table 1: Average CDRs for long-term ratings – monthly static pools

		One-, two- and three-year CDRs (FY11-21)		
Rating category	**Issuer-months**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA	13,149	0.00%	0.00%	0.00%
CRISIL AA	33,357	0.03%	0.11%	0.22%
CRISIL A	63,679	0.16%	0.72%	1.39%
CRISIL BBB	1,95,414	0.75%	2.06%	3.62%
CRISIL BB	3,18,637	3.50%	7.43%	11.31%
CRISIL B	2,72,105	8.41%	16.90%	24.03%
CRISIL C	8,306	20.83%	34.89%	45.24%
Total	**9,04,647**			

Source: CRISIL Ratings

Since fiscal 2020, there have been two defaults from the 'CRISIL AA' category on account of Covid-19 pandemic and the subsequent lockdown; one reflected in two-year and three-year CDRs and the other in one-year, two-year and three-year CDRs.

Of the two issuers, one is an airport operator whose revenue plummeted because of the sharp decline in passenger traffic. This led to an acute stretch in the liquidity profile, which was already burdened by large investments for capital expenditure in its subsidiary – an airport operator in the same catchment area – and significant delays in monetisation of real estate, resulting in a default.

The other issuer is an apparel retailer whose operations were significantly impacted as the pandemic-led lockdown led to sudden closure of stores, thus choking cash flow. The impact of the pandemic was exacerbated by the put option exercised by one of the debt investors, even as the retailer, along with other key group companies, was amidst a distress slump sale and debt restructuring exercise with their lenders. The weakened financial flexibility of the retailer eventually resulted in a default.

One-year transition rates for ratings on long- and short-term scales

Transition rates indicate the instances of a given rating migrating to other rating categories (*see Table 2*). As credit ratings drive bond yields, and therefore, their prices, transition rates are relevant for investors who do not intend to hold debt

instruments to maturity or need to mark their investments to market regularly. They are also of crucial importance to investors mandated to hold investments of a minimum credit quality.

Table 2: Average one-year transition rates for long-term ratings (FY11-21) – monthly static pools

Rating category	Issuer-months	CRISIL AAA	CRISIL AA	CRISIL A	CRISIL BBB	CRISIL BB	CRISIL B	CRISIL C	CRISIL D
CRISIL AAA	13,149	98.60%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CRISIL AA	33,357	1.30%	96.28%	2.26%	0.12%	0.01%	0.00%	0.00%	0.03%
CRISIL A	63,679	0.02%	2.68%	92.56%	4.31%	0.22%	0.03%	0.03%	0.16%
CRISIL BBB	1,95,414	0.00%	0.05%	2.46%	90.90%	5.57%	0.19%	0.07%	0.75%
CRISIL BB	3,18,637	0.00%	0.00%	0.01%	3.73%	88.76%	3.78%	0.23%	3.50%
CRISIL B	2,72,105	0.00%	0.00%	0.00%	0.04%	8.03%	83.07%	0.45%	8.41%
CRISIL C	8,306	0.00%	0.00%	0.01%	0.00%	1.32%	19.40%	58.44%	20.83%
Total	**9,04,647**								

Source: CRISIL Ratings

The highlighted diagonal in Table 2 indicates the stability rate of each rating category. Between fiscals 2011 and 2021, 96.3% of 'CRISIL AA' ratings remained in that category at the end of one year, 1.3% were upgraded to 'CRISIL AAA', and 2.4% were downgraded to 'CRISIL A' category or lower.

The one-year transition rates of CRISIL Ratings, like its default rates, are comprehensive and reliable. This is because they have been compiled using monthly static pools that cover data for the past 10 fiscals and are representative of the prevailing credit environment. CRISIL Ratings has also published the one-year transition rates over a longer period, that is, since the first rating was assigned, thus covering multiple business cycles (*see Table A8, Annexure 4; for transition rates based on the annual static pools methodology, see Tables A9 and A10, Annexure 4).*

Table 3 provides the average one-year transition rates for the short-term ratings of CRISIL Ratings. The diagonal displays the stability rates for each rating. The numbers to the left of the highlighted diagonal represent the proportion of upgrades, while those to the right represent the proportion of downgrades. For instance, the stability rate for the 'CRISIL A1+' rating is 98.2% and 6.4% of 'CRISIL A1' ratings have been upgraded to 'CRISIL A1+' in a year.

Table 3: Average one-year transition rates for short-term ratings (FY11-21) – monthly static pools

Rating*	Issuer-months	CRISIL A1+	CRISIL A1	CRISIL A2	CRISIL A3	CRISIL A4	CRISIL D
CRISIL A1+	50,675	98.18%	1.57%	0.15%	0.06%	0.02%	0.03%
CRISIL A1	22,600	6.38%	87.19%	5.38%	0.39%	0.31%	0.36%
CRISIL A2	53,884	0.13%	4.52%	88.28%	5.45%	1.08%	0.54%
CRISIL A3	1,10,385	0.02%	0.05%	4.40%	87.08%	7.73%	0.72%
CRISIL A4	3,45,383	0.00%	0.01%	0.01%	2.29%	92.52%	5.18%
Total	**5,82,927**						

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings at the respective modifier levels.*

Source: CRISIL Ratings

CRISIL Ratings has also published one-year transition rates since the first rating was assigned, covering multiple business cycles (*see Table A11, Annexure 4; for transition rates based on the annual static pools methodology, see Tables A12 and A13, Annexure 4).*

Movement in stability rates for long-term ratings

Stability rates indicate the proportion of ratings that have remained unchanged over a period. The stability rates of CRISIL Ratings have been high for investment-grade ratings and have increased over the years, indicating lower volatility in these categories. Table 4 indicates the one-year stability rates for various periods. The stability rate for 'CRISIL AA' and below has increased for fiscals 2011-2021 from that in fiscals 2010-2020. The stability rates for 'CRISIL AAA' and 'CRISIL AA' ratings have consistently exceeded 97% and 95%, respectively, while those for 'CRISIL A' and 'CRISIL BBB' ratings have exceeded 91% and 90%, respectively.

Table 4: Average one-year stability rates for various periods – monthly static pools

Period	CRISIL AAA	CRISIL AA	CRISIL A	CRISIL BBB
FY11-21	**98.6%**	**96.3%**	**92.6%**	**90.9%**
FY10-20	98.8%	96.1%	92.4%	90.8%
FY09-19	98.2%	95.4%	92.0%	90.8%
2008 – 2018*	98.8%	95.7%	91.9%	90.8%
2007 – 2017*	97.8%	95.3%	91.7%	90.6%
2006 – 2016*	97.6%	95.3%	91.6%	90.2%

Source: CRISIL Ratings

**Refers to calendar year as CRISIL Ratings earlier published its default study on a calendar year basis, until it was changed to fiscal year to harmonise with other disclosures / publications. The reported fiscal year figures cannot be strictly compared with the previous reported calendar year figures due to the minor difference in the timeframe of computation and methodology (refer CRISIL Default Study FY 2020 for a detailed comparison of the previous and current methodologies).*

Table 5 indicates the average one-year stability rate of each rating category over several periods since 1988. These continue to display higher stability each year.

Table 5: Average one-year stability rates since 1988 – monthly static pools

Period	CRISIL AAA	CRISIL AA	CRISIL A	CRISIL BBB
FY89-21	**97.7%**	**94.3%**	**90.5%**	**90.2%**
FY89-20	97.6%	94.0%	90.2%	90.1%
FY89-19	97.6%	93.7%	89.8%	90.0%
1988 - 2018*	97.6%	93.7%	89.7%	89.9%
1988 - 2017*	97.4%	93.3%	88.9%	89.2%
1988 - 2016*	97.3%	93.3%	88.7%	88.6%

Source: CRISIL Ratings

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IV. Default rates of structured finance instruments (ratings with 'SO' or 'CE' suffix)

CRISIL Ratings pioneered the rating of several complex structured finance instruments in the Indian market. Its data set comprises 7,143 issue years, including 3,662 issue years for retail asset-backed securities (ABS) and retail mortgage-backed securities (MBS) spanning over 29 years. CRISIL Ratings also had outstanding ratings on a variety of structured finance instruments that were also assigned an 'SO' suffix, including those backed by full or partial guarantee. In compliance with the SEBI circular in June 2019, part of the instruments backed by explicit external credit enhancement have been assigned a 'CE' suffix beginning September 2019. The performance of instruments with 'CE' suffix will continue to be reported as part of structured finance securities. For clarity, the reference to 'SO' suffix in the default and transition metrics presented in the section below also includes instruments that have migrated to the 'CE' suffix.

Furthermore, for a smaller subset of instruments, particularly those issued by corporates or special purpose vehicles, the 'SO' suffix has been removed since September 2019 based on structuring of internal cash flows. Practical challenges arise in tracking such instruments on a consistent basis without a suffix. Hence, to ensure consistency on removal of the suffix, these instruments have been considered at par with other plain vanilla instruments and are being reported as part of corporate issuers. However, given the smaller subset of such instruments in comparison with the larger pool of securitised instruments that carry an 'SO' suffix, this change has not led to a material impact on the metrics.

One-, two- and three-year CDRs

Table 6 provides the one-, two- and three-year average CDRs for each rating category between fiscals 1993[3] and 2021 (*see Table A14 in Annexure 5 for default rates during fiscals 2011-21).*

Table 6: Average CDRs for ratings on structured finance instruments – annual static pools

		One-, two- and three-year CDRs (FY93-21)		
Rating category	**Issue-years**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA (SO)	3,975	0.05%	0.13%	0.25%
CRISIL AA (SO)	1,340	0.22%	0.55%	0.85%
CRISIL A (SO)[4]	1,042	0.58%	1.89%	4.80%
CRISIL BBB (SO)	650	0.77%	2.06%	2.06%
CRISIL BB (SO) and below	136	22.79%	40.10%	42.95%
Total	**7,143**			

Source: CRISIL Ratings

The non-zero default rates in the 'CRISIL AAA (SO)' category are on account of defaults on instruments by two issuers. One was a central government-guaranteed, 'CRISIL AAA (SO)'-rated instrument that defaulted in fiscal 2005 because the trustee delayed the invocation of the guarantee, resulting in a delay in payments to investors. Under its rigorous default recognition

[3] CRISIL Ratings assigned its first structured finance rating in January 1992, which forms a part of the 1993 annual static pool. For calculating default and transition rates for structured finance ratings, CRISIL Ratings has used the annual static pool methodology as defaults in structured finance securities have been rare.

[4] The default rates in the 'CRISIL A (SO)' category are largely on account of defaults on multiple instruments of two issuers backed by the same guarantor. If all the instruments were treated as one, the three-year-default rate would be 2.54%

norms, CRISIL Ratings treated this as a default. The default was subsequently cured, the investors were paid in full, and the rated instrument was redeemed.

The other pertained to a securitised instrument issued by a non-bank, where the originating non-bank defaulted and subsequently went into liquidation in fiscal 2020. The ratings on the securitised instruments were downgraded due to commingling risks, despite adequate collections and cash collateral. Furthermore, due to legal interpretation issues, the trustee did not make payments to the investors despite available cash collateral and hence the rating was downgraded to default in fiscal 2020. The same trust also had another instrument that defaulted from the 'CRISIL AA (SO)' category.

One-year transition rates

Around 56% of all structured finance ratings – 3,975 of 7,143 issue years – are rated 'CRISIL AAA (SO)' and show a high stability rate of over 98%. Table 7 shows the average one-year transition rates during fiscals 1993-2021 for structured finance instruments.

Table 7: Average one-year transition rate for structured finance instruments (FY93-21) – annual static pools

Rating category	Issue-years	CRISIL AAA (SO)	CRISIL AA (SO)	CRISIL A (SO)	CRISIL BBB (SO)	CRISIL BB (SO) and below	CRISIL D (SO)
CRISIL AAA (SO)	3,975	98.42%	1.36%	0.15%	0.00%	0.03%	0.05%
CRISIL AA (SO)	1,340	3.96%	93.81%	1.64%	0.00%	0.37%	0.22%
CRISIL A (SO)	1,042	0.67%	6.05%	88.20%	2.21%	2.30%	0.58%
CRISIL BBB (SO)	650	2.15%	2.00%	11.08%	82.00%	2.00%	0.77%
CRISIL BB (SO) and below	136	2.21%	0.74%	2.21%	8.09%	63.97%	22.79%
Total	**7,143**						

Source: CRISIL Ratings

The highlighted diagonal in Table 7 shows the stability rates for various rating categories.

Movement in stability rates

Table 8: Average one-year stability rates of structured finance ratings since 1993 – annual static pools

Period	CRISIL AAA (SO)	CRISIL AA (SO)	CRISIL A (SO)	CRISIL BBB (SO)
FY93-21	**98.4%**	**93.8%**	**88.2%**	**82.0%**
FY93-20	98.3%	92.4%	87.8%	81.4%
FY93-19	98.4%	92.2%	88.1%	81.3%
1993-2018*	98.4%	91.6%	87.7%	80.6%
1993-2017*	98.4%	91.3%	88.4%	80.5%
1993-2016*	98.4%	91.5%	88.6%	80.4%

Source: CRISIL Ratings

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Table 9: Average one-year stability rates of structured finance ratings – annual static pools

Period	CRISIL AAA (SO)	CRISIL AA (SO)	CRISIL A (SO)	CRISIL BBB (SO)
FY11-21	**99.5%**	**95.6%**	**85.3%**	**80.0%**
FY10-20	99.5%	93.6%	84.8%	79.7%
FY09-19	98.3%	93.2%	86.1%	80.4%
2008-18*	99.6%	92.3%	84.7%	78.1%
2007-2017*	98.3%	92.2%	86.9%	79.5%
2006-2016*	98.3%	93.1%	88.2%	80.0%

Source: CRISIL Ratings

**Refers to calendar year as CRISIL Ratings earlier published its default study on a calendar year basis, until it was changed to fiscal year to harmonise with other disclosures / publications. The reported fiscal year figures cannot be strictly compared with the previous reported calendar year figures due to the minor difference in the timeframe of computation and methodology (Refer CRISIL Default Study FY 2020 for a detailed comparison of the previous and current methodologies).*

V. One-year transition rate of retail asset-backed (ABS) and mortgage-backed securities (MBS) issuances

The CRISIL Ratings database of retail ABS and MBS transactions consists of 3,662 issue years across 29 years (fiscals 1993-2021). Table 10 shows the transition rates for ABS and MBS ratings for this period. The 'CRISIL AAA (SO)'-rated ABS or MBS instruments, which account for close to three-fourths of the ratings in the database, have a stability rate of 98.3%.

Table 10: Average one-year transition rates for ABS and MBS ratings (FY93-21) – annual static pools

Rating category	Issue years	CRISIL AAA (SO)	CRISIL AA (SO)	CRISIL A (SO)	CRISIL BBB (SO)	CRISIL BB (SO) and below	CRISIL D (SO)
CRISIL AAA (SO)	2,635	98.29%	1.44%	0.19%	0.00%	0.04%	0.04%
CRISIL AA (SO)	306	13.40%	83.33%	1.31%	0.00%	1.63%	0.33%
CRISIL A (SO)	199	3.52%	12.56%	80.40%	3.02%	0.50%	0.00%
CRISIL BBB (SO)	497	2.82%	2.62%	10.06%	83.50%	0.40%	0.60%
CRISIL BB (SO) and below	25	12.00%	4.00%	4.00%	12.00%	56.00%	12.00%
Total	**3,662**						

Source: CRISIL Ratings

The non-zero default rates in the 'CRISIL AAA (SO)' and 'CRISIL AA (SO)' categories are on account of defaults in two RMBS instruments (one in each of the above rating categories) issued by a trust. The originator of these instruments was a non-bank, which defaulted and subsequently went into liquidation in fiscal 2020. The ratings on the securitised instruments were downgraded due to commingling risks, despite adequate collections and cash collateral. Furthermore, due to legal interpretation issues, the trustee did not make payments to the investors despite available cash collateral and hence, the rating was downgraded to default in fiscal 2020.

The stability rate in the 'CRISIL AAA (SO)' category is comparable with that in the 'CRISIL AAA' category. Data density is sparse below 'CRISIL AAA (SO)', largely explaining the non-ordinal stability rates below that rating category. Furthermore, a significant number of instruments rated 'CRISIL AA (SO)' and 'CRISIL A (SO)' have performed well, resulting in upgrades.

Conclusion

The overall annual default rate declined to 2.0% in fiscal 2021 from 4.5% in fiscal 2020, driven by regulatory measures introduced in the wake of Covid-19. It is partly explained by the median rating moving up, albeit as a result of the portfolio shrinking at the lower end of the rating spectrum. The absolute number of defaults declined over 60% in fiscal 2021. Nevertheless, the overall default rate is likely to rise over the medium term as the temporary pandemic-induced regulatory measures are phased out.

The robustness of the rating process of CRISIL Ratings continues to be demonstrated by the ordinality of its default rates and the high stability of its ratings. CRISIL Ratings has set up, stabilised and refined its processes over almost three decades of rating experience. The quality of its ratings is today recognised by issuers and investors. This study is based on ratings assigned over 30 years, covering multiple credit cycles. Because of the quality, vintage and diversity of the instruments, the size of the database, and the use of monthly static pool methodology, this remains the most comprehensive study on corporate defaults and rating transitions in India.

VI. Annexures

1: Comparison of methodologies

Parameters	SEBI methodology[5]	CRISIL Ratings methodology
Static pool	Monthly static pool	Both monthly and annual static pools
Withdrawal adjustment	Exclude ratings that are withdrawn during the year, except securities	Exclude ratings that are withdrawn during the year
Treatment of non-cooperative issuers	Issuers that turn non-cooperative during the year are included	Issuers that turn non-cooperative during the year are excluded (barring those that have defaulted)
Calculating CDR	Average marginal default rate methodology	Average marginal default rate methodology
Time frame	For last 121 cohorts for long run; and for 24, 36, 48 cohorts for short run	For last 121 cohorts and since inception
Issuer/ instrument reporting	Corporate issuers are reported at issuer level and 'SO' instruments are reported at instrument level with the following adjustments: Corporate issuers with multiple ratings of different seniority levels on different instruments accounted with a cap of 3 instances For structured finance trusts issuing multiple tranches, the number of instances to be capped at 3 for different categories if the seniority is different	Corporate issuers are reported at issuer level and 'SO' instruments are reported at instrument level
Split of databases	Default rates on corporate issuers and structured finance instruments are provided together	Default and transition rates on corporate issuers and structured finance instruments are provided separately

[5] Refers to SEBI circular dated June 13, 2019, titled 'Guidelines for enhanced disclosures by credit rating agencies'

2: CDRs disclosed as per SEBI[6] methodology

In line with the SEBI methodology outlined in Annexure 1, Tables A1 to A4 include ratings on corporate issuers, structured finance instruments and non-cooperative issuers. The computation includes adjustments prescribed in the June 2019 circular.

Table A1: Long-run average default rates for long-term instruments - monthly static pools

	One-, two- and three-year CDRs (FY11-21)		
Rating category	**One-year**	**Two-year**	**Three-year**
CRISIL AAA	0.01%^	0.07%^	0.15%
CRISIL AA	0.09%*	0.25%	0.40%
CRISIL A	0.18%	0.78%	1.50%
CRISIL BBB	0.71%	1.91%	3.28%
CRISIL BB	2.87%	5.75%	8.41%
CRISIL B	6.21%	11.74%	16.03%
CRISIL C	17.25%	28.27%	36.29%

^On account of one default in fiscal 2020 that occurred due to an unexpected legal event

**Since fiscal 2020, there were two defaults due to an unexpected legal event and the pandemic*

6 The computation of default rates is in line with the methodology articulated in SEBI circular dated June 13, 2019. These are also available on CRISIL website at: https://www.crisil.com/content/dam/crisil/generic-images1/our-businesses/ratings/regulatory-disclosure-highlighted-policies/regulatory-disclosures/sebi/disclosures-as-per-sebi-circular-cir-mirsd-cra-6-2010/long-run-and-short-run-average-default-rates.pdf

Table A2: Long-run average default rates for short-term instruments – monthly static pools

Rating*	One-year default rate FY11-21
CRISIL A1+	0.03%
CRISIL A1	0.36%
CRISIL A2	0.52%
CRISIL A3	0.68%
CRISIL A4	4.25%

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings at the respective modifier levels.*

Table A3: Short-run average default rates for long-term instruments – monthly static pools

	One-, two- and three-year CDRs		
Rating category	**One-year**	**Two-year**	**Three-year**
Period	**FY19-21**	**FY18-21**	**FY17-21**
CRISIL AAA	0.07%^	0.31%^	0.55%
CRISIL AA	0.18%*	0.53%	0.70%
CRISIL A	0.05%	0.21%	0.53%
CRISIL BBB	0.39%	1.68%	3.03%
CRISIL BB	2.08%	4.07%	6.14%
CRISIL B	4.46%	8.76%	12.55%
CRISIL C	12.05%	20.18%	31.23%

^On account of one default in fiscal 2020 that occurred due to an unexpected legal event

**Since fiscal 2020, there were two defaults due to an unexpected legal event and the pandemic*

Table A4: Short-run average default rates for short-term instruments – monthly static pools

Rating*	One-year default rate FY19-21
CRISIL A1+	0.06%
CRISIL A1	0.04%
CRISIL A2	0.30%
CRISIL A3	0.47%
CRISIL A4	3.05%

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings at the respective modifier levels*

3: Comparative default rates for different periods

Table A5: CDRs for long-term ratings (FY89-21) – monthly static pools

		One-, two- and three-year CDRs		
Rating category	**Issuer-months**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA	24,072	0.00%	0.00%	0.00%
CRISIL AA	55,562	0.03%	0.23%	0.57%
CRISIL A	85,695	0.35%	1.48%	3.01%
CRISIL BBB	2,13,263	0.91%	2.40%	4.31%
CRISIL BB	3,29,282	3.65%	7.67%	11.64%
CRISIL B	2,76,266	8.41%	16.93%	24.02%
CRISIL C	9,867	21.47%	35.43%	45.01%
Total	**9,94,007**			

Source: CRISIL Ratings

Table A6: CDRs for long-term ratings (FY11-21) – annual static pools

		One-, two- and three-year CDRs		
Rating category	**Issuer-years**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA	1,199	0.00%	0.00%	0.00%
CRISIL AA	3,038	0.07%	0.22%	0.32%
CRISIL A	5,788	0.12%	0.71%	1.45%
CRISIL BBB	17,459	0.70%	1.92%	3.59%
CRISIL BB	27,979	3.42%	7.31%	11.11%
CRISIL B	23,627	8.30%	16.79%	23.97%
CRISIL C	750	20.27%	33.26%	43.53%
Total	**79,840**			

Source: CRISIL Ratings

Table A7: CDRs for long-term ratings (FY89-21) – annual static pools

		One-, two- and three-year CDRs		
Rating category	**Issuer-years**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA	2,067	0.00%	0.00%	0.00%
CRISIL AA	4,793	0.06%	0.30%	0.61%
CRISIL A	7,481	0.37%	1.48%	3.01%
CRISIL BBB	18,541	0.80%	2.26%	4.14%
CRISIL BB	28,515	3.61%	7.58%	11.46%
CRISIL B	23,763	8.30%	16.79%	24.00%
CRISIL C	849	20.97%	34.54%	44.59%
Total	**86,009**			

Source: CRISIL Ratings

4: Comparative transition rates for different periods

One-year transition rates for long-term ratings

Table A8: Average one-year transition rates (FY89-21) – monthly static pools

Rating category	**Issuer-months**	**CRISIL AAA**	**CRISIL AA**	**CRISIL A**	**CRISIL BBB**	**CRISIL BB**	**CRISIL B**	**CRISIL C**	**CRISIL D**
CRISIL AAA	24,072	97.67%	2.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CRISIL AA	55,562	1.54%	94.30%	3.61%	0.36%	0.12%	0.02%	0.02%	0.03%
CRISIL A	85,695	0.02%	2.97%	90.52%	4.92%	1.00%	0.08%	0.15%	0.35%
CRISIL BBB	2,13,263	0.00%	0.06%	2.58%	90.20%	5.81%	0.29%	0.15%	0.91%
CRISIL BB	3,29,282	0.00%	0.01%	0.01%	3.72%	88.54%	3.77%	0.31%	3.65%
CRISIL B	2,76,266	0.00%	0.00%	0.00%	0.05%	8.05%	83.03%	0.46%	8.41%
CRISIL C	9,867	0.00%	0.00%	0.01%	0.12%	1.29%	18.19%	58.92%	21.47%
Total	**9,94,007**								

Source: CRISIL Ratings

Table A9: Average one-year transition rates (FY11-21) – annual static pools

Rating category	Issuer-years	CRISIL AAA	CRISIL AA	CRISIL A	CRISIL BBB	CRISIL BB	CRISIL B	CRISIL C	CRISIL D
CRISIL AAA	1,199	98.75%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CRISIL AA	3,038	1.15%	96.54%	2.14%	0.10%	0.00%	0.00%	0.00%	0.07%
CRISIL A	5,788	0.03%	2.73%	92.81%	4.04%	0.21%	0.03%	0.02%	0.12%
CRISIL BBB	17,459	0.00%	0.04%	2.49%	91.04%	5.46%	0.19%	0.08%	0.70%
CRISIL BB	27,979	0.00%	0.00%	0.01%	3.71%	88.99%	3.64%	0.23%	3.42%
CRISIL B	23,627	0.00%	0.00%	0.00%	0.03%	7.95%	83.28%	0.44%	8.30%
CRISIL C	750	0.00%	0.00%	0.00%	0.00%	1.47%	19.60%	58.67%	20.27%
Total	**79,840**								

Source: CRISIL Ratings

Table A10: Average one-year transition rates (FY89-21) – annual static pools

Rating category	Issuer-years	CRISIL AAA	CRISIL AA	CRISIL A	CRISIL BBB	CRISIL BB	CRISIL B	CRISIL C	CRISIL D
CRISIL AAA	2,067	97.73%	2.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CRISIL AA	4,793	1.48%	94.62%	3.48%	0.23%	0.10%	0.02%	0.00%	0.06%
CRISIL A	7,481	0.03%	2.86%	90.78%	4.73%	1.02%	0.08%	0.13%	0.37%
CRISIL BBB	18,541	0.00%	0.06%	2.57%	90.41%	5.72%	0.29%	0.15%	0.80%
CRISIL BB	28,515	0.00%	0.01%	0.01%	3.68%	88.75%	3.65%	0.30%	3.61%
CRISIL B	23,763	0.00%	0.00%	0.00%	0.03%	7.92%	83.28%	0.45%	8.30%
CRISIL C	849	0.00%	0.00%	0.00%	0.12%	1.53%	17.55%	59.84%	20.97%
Total	**86,009**								

Source: CRISIL Ratings

One-year transition rates for short-term ratings

Table A11: Average one-year transition rates (FY89-21) – monthly static pools

Rating*	Issuer-months	CRISIL A1+	CRISIL A1	CRISIL A2	CRISIL A3	CRISIL A4	CRISIL D
CRISIL A1+	93,266	97.71%	1.85%	0.25%	0.16%	0.02%	0.02%
CRISIL A1	29,743	8.51%	85.68%	4.71%	0.49%	0.25%	0.35%
CRISIL A2	58,790	0.20%	4.53%	88.23%	5.34%	1.12%	0.58%
CRISIL A3	1,16,995	0.02%	0.04%	4.39%	87.02%	7.74%	0.78%
CRISIL A4	3,54,488	0.00%	0.01%	0.01%	2.28%	92.52%	5.18%
Total	**6,53,282**						

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings at the respective modifier levels*

Source: CRISIL Ratings

Table A12: Average one-year transition rates (FY11-21) – annual static pools

Rating*	Issuer-years	CRISIL A1+	CRISIL A1	CRISIL A2	CRISIL A3	CRISIL A4	CRISIL D
CRISIL A1+	4,619	98.31%	1.47%	0.13%	0.04%	0.02%	0.02%
CRISIL A1	2,051	6.73%	87.18%	5.07%	0.44%	0.29%	0.29%
CRISIL A2	4,867	0.12%	4.56%	88.45%	5.32%	1.05%	0.49%
CRISIL A3	9,812	0.02%	0.02%	4.45%	87.26%	7.60%	0.64%
CRISIL A4	30,200	0.00%	0.01%	0.02%	2.28%	92.58%	5.12%
Total	**51,549**						

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings at the respective modifier levels*

Source: CRISIL Ratings

Table A13: Average one-year transition rates (FY89-21) – annual static pools

Rating*	Issuer-years	CRISIL A1+	CRISIL A1	CRISIL A2	CRISIL A3	CRISIL A4	CRISIL D
CRISIL A1+	8,028	97.72%	1.87%	0.27%	0.09%	0.04%	0.01%
CRISIL A1	2,558	9.38%	85.07%	4.53%	0.47%	0.23%	0.31%
CRISIL A2	5,150	0.17%	4.56%	88.12%	5.34%	1.26%	0.54%
CRISIL A3	10,098	0.02%	0.02%	4.41%	87.24%	7.63%	0.68%
CRISIL A4	30,495	0.00%	0.01%	0.02%	2.27%	92.59%	5.13%
Total	**56,329**						

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings at the respective modifier levels*

Source: CRISIL Ratings

5: Comparative default rates for structured finance instruments

Table A14: CDRs for ratings of structured finance instruments (FY11-21)

	One-, two- and three-year CDRs			
Rating category	**Issue-years**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA (SO)[7]	1,725	0.06%	0.15%	0.29%
CRISIL AA (SO)	1,010	0.30%	0.60%	0.82%
CRISIL A (SO)	538	1.12%	4.54%	10.02%
CRISIL BBB (SO)	531	0.94%	2.63%	2.63%
CRISIL BB (SO) and below	89	26.97%	43.82%	53.18%
Total	**3,893**			

Source: CRISIL Ratings

[7] The non-zero default rates in the 'CRISIL AAA (SO)' category are on account of default on a securitised instrument issued by a non-bank, where the originating non-bank defaulted and subsequently went into liquidation in fiscal 2020. Due to legal interpretation issues, the trustee did not make payments to the investors despite available cash collateral.

6: Comparative default and transition rates for corporate issuers including ratings on non-cooperative issuers[8]

Table A15: CDRs for long-term ratings – monthly static pools

One, two and three-year CDRs (FY11-21)				
Rating category	**Issuer-months**	**One-year**	**Two-year**	**Three-year**
CRISIL AAA	13,155	0.00%	0.00%	0.00%
CRISIL AA	33,374	0.03%	0.11%	0.22%
CRISIL A	64,305	0.16%	0.71%	1.37%
CRISIL BBB	2,09,368	0.70%	1.89%	3.25%
CRISIL BB	4,24,563	2.83%	5.68%	8.32%
CRISIL B	4,19,191	6.19%	11.71%	16.00%
CRISIL C	11,540	16.67%	27.41%	35.25%
Total	**11,75,496**			

Source: CRISIL Ratings

Table A16: Average one-year transition rates for long-term ratings (FY11-21) – monthly static pools

Rating category	**Issuer-months**	**CRISIL AAA**	**CRISIL AA**	**CRISIL A**	**CRISIL BBB**	**CRISIL BB**	**CRISIL B**	**CRISIL C**	**CRISIL D**
CRISIL AAA	13,155	98.59%	1.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CRISIL AA	33,374	1.29%	96.27%	2.27%	0.12%	0.01%	0.00%	0.00%	0.03%
CRISIL A	64,305	0.02%	2.65%	92.02%	4.53%	0.54%	0.05%	0.03%	0.16%
CRISIL BBB	2,09,368	0.00%	0.05%	2.33%	86.84%	9.65%	0.34%	0.09%	0.70%
CRISIL BB	4,24,563	0.00%	0.00%	0.01%	3.00%	83.82%	10.15%	0.19%	2.83%
CRISIL B	4,19,191	0.00%	0.00%	0.00%	0.04%	5.59%	87.85%	0.32%	6.19%
CRISIL C	11,540	0.00%	0.00%	0.01%	0.00%	0.95%	14.12%	68.24%	16.67%
Total	**11,75,496**								

Source: CRISIL Ratings

8 In computing default statistics, entities classified as 'issuer not cooperating' were considered as a part of the static pools and were not treated as withdrawals on classification

Table A17: Average one-year transition rates for short-term ratings (FY11-21) – monthly static pools

Rating*	Issuer-months	CRISIL A1+	CRISIL A1	CRISIL A2	CRISIL A3	CRISIL A4	CRISIL D
CRISIL A1+	50,723	98.12%	1.58%	0.16%	0.07%	0.04%	0.03%
CRISIL A1	22,795	6.33%	86.90%	5.47%	0.42%	0.54%	0.36%
CRISIL A2	55,424	0.12%	4.41%	86.63%	5.71%	2.60%	0.52%
CRISIL A3	1,18,002	0.02%	0.04%	4.18%	83.25%	11.84%	0.67%
CRISIL A4	4,68,826	0.00%	0.01%	0.03%	1.79%	93.93%	4.24%
Total	**7,15,770**						

**CRISIL A2, CRISIL A3, and CRISIL A4 include ratings of the respective modifier levels*

Source: CRISIL Ratings

7: Industry-wise classification of defaults

CRISIL Ratings is the first rating agency in India to publish industry-wise classifications and a chronological account of all defaults in its portfolio that form part of the static pools used for computing default rates. Since the inception of CRISIL Ratings, there have been 3,495 defaults by issuers with long-term ratings. Over the past 33 years, five industries (textiles, distributors, food products, metals and mining, and real estate development) accounted for almost 50% of these defaults, as shown in Table A18.

Table A18: Industry-wise, chronological break-up of defaults on long-term instruments in the past 33 years

Industry	1988 to 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	FY 2019	FY 2020	FY 2021
Textiles- Apparel & Luxury Goods		1	1	3	1	3	1	1		1					3	8	12	26	50	45	53	46	55	52	70	55	39	10
Distributors																1	3	9	31	37	48	59	53	39	42	27	15	9
Food Products				1	2	3					1					3	6	7	23	30	44	43	51	35	52	40	34	16
Metals & Mining			2	1	6	2	2	2			1					2	6	28	34	31	23	35	19	23	6	4	12	6
Real Estate Development						1		1								1	2	4	7	14	35	25	38	35	16	16	21	5
Construction & Engineering					1			1								3	4	4	16	21	28	20	25	23	32	34	27	11
Machinery					2	2	1									3	3	6	17	19	18	20	27	16	13	10	21	4
Diversified Consumer Services																1	1	8	10	22	11	16	17	9	13	11	11	5
Specialty Retail																		2	8	11	13	13	9	16	9	10	15	8
Containers & Packaging					2	1										1	3	1	13	10	6	12	12	7	9	10	6	4
Hotels Restaurants & Leisure						1										2	5	7	16	10	8	4	6	9	2	2	7	3
Construction Materials			1		2	2	1		1							2	1	3	8	12	5	3	6	11	6	7	5	3
Independent Power Producers & Energy Traders								1							1	1	3	4	7	10	6	5	6	13	6	3	9	0
Auto Components			1		1	1		1								1	1	2	11	9	6	5	10	9	4	2	2	3
Pharmaceuticals			1		1	2		1								4	2	5	7	4	13	7	4	3	6	6	5	1
Electrical Equipment						1	1										2	7	6	11	9	7	2	2	8	6	6	1
Chemicals				1	2	2	3	3	1								1	1	6	3	4	7	6	8	3	3	5	3
Building Products															1			2	9	1	3	8	10	9	7	8	6	3
Paper & Forest Products				1	1	1									1	1	5	4	4	6	4	6	4	4	2	1	1	0
Commercial Services & Supplies						1										3		1	5	2	4	7	7	5	5	5	13	8
Household Durables		1	1		3				1							3		1	5	2	4	5	4	3	3	3	6	1
Health Care Providers & Services																	1	2	4	4	2	6	3	6	5	4	9	3
Electronic Equipment Instruments & Components							1									1		4	1	2	8	3		6	5	3	7	2
Non Banking Financial Company				4	12	2												2						1			1	0
Others				2	9	2	2				1					2	7	21	43	30	23	33	29	20	21	35	34	13
Total Defaults	0	2	7	13	45	27	12	11	3	1	3	0	0	0	6	43	68	161	341	346	378	395	403	364	345	305	317	122
Overall Annual Default Rate*	0.0%	0.6%	1.2%	2.3%	9.5%	6.3%	3.7%	4.1%	1.3%	0.5%	1.0%	0.0%	0.0%	0.0%	0.5%	3.2%	2.3%	3.5%	5.3%	4.4%	4.4%	4.1%	4.2%	4.1%	4.4%	4.0%	4.5%	2.0%

** The proportion of total defaults in a particular year to total non-default ratings outstanding at the beginning of the year (adjusted for withdrawals and non-cooperative issuers during the year)*

Source: CRISIL Ratings

The number of defaults, in absolute terms, in fiscal 2021 remained low compared with previous periods, largely on account of regulatory measures. Consequently, the annual default rate was significantly lower compared with previous fiscals. The higher default rates between fiscals 1997 and 1999 were because of economic slowdown and structural/regulatory changes, especially in the financial sector.

8: Analysis of defaults: Time to default (for corporate issuers)

Higher ratings farther away from default

Analysis of the 3,495 defaults (*see Table A19*) indicates that the higher-rated firms were farther away from default than lower-rated ones. Issuers that were rated in the 'CRISIL B' or 'CRISIL C' categories and which defaulted did so in 19 and 17 months, respectively; issuers rated 'CRISIL A' and 'CRISIL AA' and which defaulted did so in 49 and 57 months, respectively.

Time to default for issuers rated 'CRISIL AAA' was around 15 years[9].

Table A19: Average time to default (for defaulted firms) in number of months

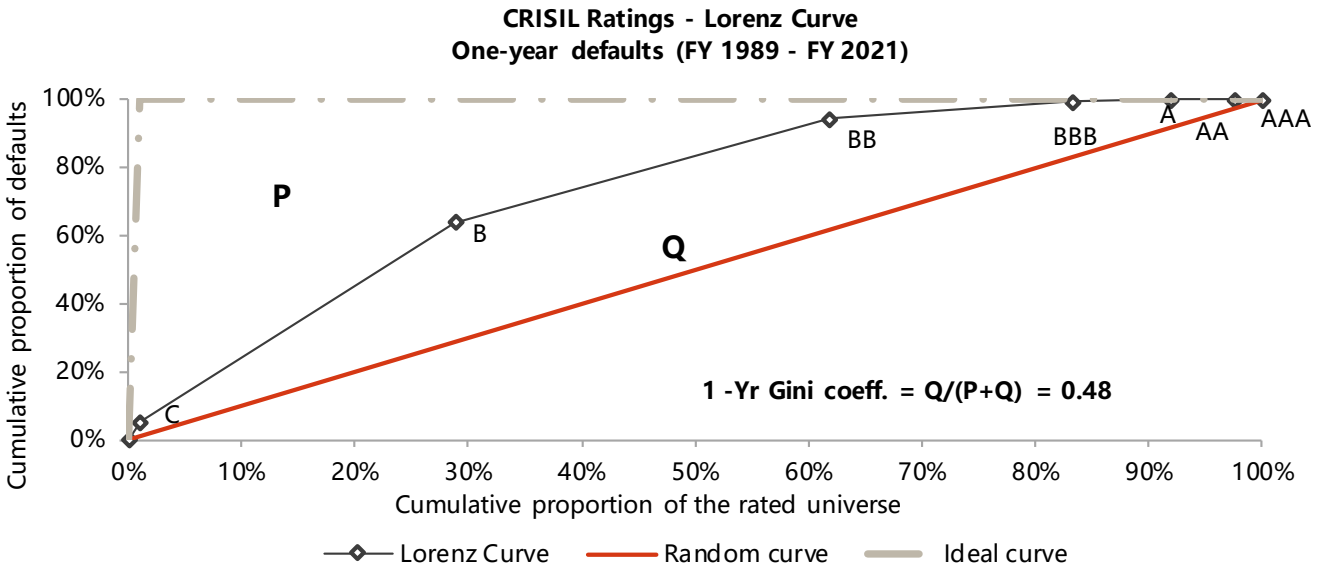
Rating category	Months to default
CRISIL AAA	177
CRISIL AA	57
CRISIL A	49
CRISIL BBB	35
CRISIL BB	23
CRISIL B	19
CRISIL C	17

Source: CRISIL Ratings

[9] In the 33 years through 2021, only one entity originally rated 'CRISIL AAA' has ever defaulted. The entity was last rated 'CRISIL AAA' in 2009, and has been gradually downgraded over the years due to significant changes in its business and financial risk profiles. It eventually defaulted in 2018 from a much lower rating category. The defaulted instrument was repaid shortly post default and the investors did not face any loss.

9: Lorenz curve and Gini coefficient for CRISIL Ratings

Chart 3: Graphical representation of the Gini coefficient and the Lorenz curve



Source: CRISIL Ratings

The Gini coefficient for one-year defaults rates of CRISIL Ratings has improved marginally to 0.48 in fiscals 1989 to 2021 from 0.46 in fiscals 1989 to 2018. Further, the one-year Gini coefficient for fiscal 2021 rose to 0.66 from 0.58 in fiscal 2020. This was led by higher proportion of defaults from lower rated categories. Though the Gini coefficient has improved owing to a rigorous surveillance processes, it continues to face challenges. Some factors that have impacted the coefficient are as follows:

- Typically, a 'CRISIL C' rating is assigned when a firm defaults on unrated debt while continuing to service rated debt on time. In most instances, such firms continue to default on unrated debt but service their rated bank loan facilities (typically a revolving working capital facility) on time, thereby avoiding a rating of 'CRISIL D'. Ideally, for a high Gini coefficient, a large portion of defaults should be from the 'CRISIL C' category, the lowest non-default rating category.
- There is an inherent mismatch between the credit discipline required by CRAs such as CRISIL Ratings (which recognises default as a 'single-rupee shortfall or single-day delay') and the credit culture of the Indian banking system (where non-performing assets are recognised at 90 days past due). Hence, for the Gini coefficient to improve, there needs to be a systemic shift towards timely payments.
- More than half of the rated portfolio of CRISIL Ratings consists of issuers in categories 'CRISIL BB' and lower. Not only do these categories have limited information about the firms, they are also inherently vulnerable to sharp rating changes.

Reading the chart on Gini coefficient, a measure of rating accuracy

If ratings had no ability to predict default, then default rates and ratings would not be correlated. For example, consider that 30 defaults occur out of 1,000 ratings (that is, a default rate of 3%) in one year. For a randomly selected set of 100 companies (10% of the rated population), three companies could be expected to have defaulted (10% of the defaulting population), as the number of defaults one would expect in a sample is proportional to the selected number of companies. This is represented by the random curve, which will be a diagonal straight line. However, if ratings are perfect predictors of default, then the lowest 30 ratings should capture all the defaults in this case. This is represented by the ideal curve.

As no rating system is perfect, the actual predictive power of ratings lies between the two extremes. The cumulative curve (the Lorenz curve) represents the actual case. The closer the cumulative curve is to the ideal curve, the better the predictive power of the ratings. This is quantified by measuring the area between the cumulative and random curves (area 'Q' in Chart 3) in relation with the area between the ideal and random curves (the sum of the areas 'P' and 'Q' in Chart 3). This ratio of Q/(P+Q), called the Gini coefficient or the accuracy ratio, will be 1 if ratings have perfect predictive ability, as the cumulative curve will coincide with the ideal curve. On the other hand, the ratio will be close to zero if the ratings have poor predictive power, as the cumulative curve will almost coincide with the random curve. Thus, a higher Gini coefficient indicates the predictive ability of any rating system.

Definitions

The Lorenz curve

The Lorenz curve is a plot of the cumulative proportion of category-wise defaults (of issuers with ratings outstanding at the beginning of the year and in default at the end of the year) against the total proportion of issuers up to that category. For instance, in Chart 3, around 94% of the defaults recorded were in categories 'CRISIL BB' and lower; these included nearly 62% of the total outstanding ratings, that is, the lower 62% of the ratings accounted for 94% of all defaults.

The random curve

The random curve is a plot of the cumulative proportion of issuers against that of defaulters, assuming that defaults are distributed equally across rating categories. In such a plot, the lower 62% of the issuers would account for exactly 62% of defaults; the plot would, therefore, be a diagonal straight line, and the ratings would have no predictive value.

The ideal curve

The ideal curve is a plot of the cumulative proportion of issuers against that of defaulters if ratings were perfectly ranked such that all defaults occurred only among the lowest-rated firms. As the overall default rate of CRISIL Ratings is 2.0%, the lower 2.0% of issuers would have accounted for all defaults if the ratings were perfect default predictors and rating categories above this level would have no defaults at all.

Accuracy ratio/ Gini coefficient

Accuracy ratio = (Area between the Lorenz curve and the random curve)/(Area between the ideal curve and the random curve).

10: Methodology used by CRISIL Ratings in this study

Time period of reporting

CRISIL Ratings moved to reporting its default statistics on a fiscal basis from the 2020 edition of the default and transition study. The period of reporting prior to 2020 was January to December. Moreover, the default statistics have been aligned with the cohort size defined by SEBI in its June 2019 circular. CRISIL Ratings earlier presented its 10-year default statistics with 109 cohorts. In alignment with the SEBI disclosure norms, CRISIL Ratings has started publishing its default statistics with 121 cohorts from fiscal 2020. This brings about better comparability of default rate metrics as per the default study with those as per the regulatory requirement.

Disclosure of 'SO' instruments

In its June 2019 circular, SEBI changed the norms for assigning ratings with an 'SO' suffix. While traditional securitisation instruments will retain the 'SO' suffix, those with explicit external credit enhancement will carry a 'CE' suffix. Instruments issued by corporates, which earlier could have carried an 'SO' suffix based on internal credit enhancement/structure, shall not carry a suffix anymore. In compliance with the revised norms, CRISIL Ratings had changed the suffix for instruments placed by corporates that earlier carried an 'SO' suffix in September 2019. For default statistics, these instruments were earlier reported under structured obligations. Instruments with the 'CE' suffix will continue to be reported under the 'structured obligation' dataset. As these instruments continue to carry distinctive risks—different from those of the underlying borrowers—they are reported as part of structured obligations.

On the other hand, ratings that had an 'SO' suffix in the past but where the suffix has been removed were reported as part of long-term instruments from September 2019. This refers primarily to instruments issued by corporates, or mostly special purpose vehicles, based on structuring of the internal cash flows. In compliance with the SEBI circular dated June 13, 2019, CRISIL Ratings had removed the suffix from these instruments from September 2019. To ensure consistency, keeping in mind the practical challenges in tracking these instruments on a consistent basis without a suffix, these instruments were considered on par with other plain vanilla instruments on removal of the suffix and reported as part of corporate issuers.

Static pools

CRISIL Ratings moved to the monthly static pool method from the annual static pool method with the 2009 edition of the default and transition study. The monthly static pool methodology captures more granular monthly data, such as intra-year transition and defaults, ensuring default and transition rate estimates are more accurate and useful.

A static pool of a particular date is composed of a set of firms with a given rating outstanding as on that date. CRISIL Ratings forms static pools on the first day of every month for its default and transition study. As CRISIL Ratings calculates one-, two- and three-year CDRs, the static pools formed are of similar lengths. Once formed, the pool does not admit any new firms. For a firm to be included in an n-year static pool, its rating has to be outstanding through the entire period of n years. Firms whose ratings are withdrawn or placed in default in the interim will continue to be withdrawn or in default for the remaining years. Therefore, a firm that ceases to be rated and is subsequently rated again, or a firm in the pool that defaults and recovers later, is not considered for re-inclusion in the pool.

A firm that remains rated for more than a month is counted as many times as the number of months over which it was rated. The method assumes that all ratings are current through an ongoing surveillance process, which, in the case of CRISIL Ratings, is the cornerstone of the value proposition of its ratings.

For instance, a firm that had ratings live (not withdrawn) from April 1, 2000, to April 1, 2002, would appear in 12 consecutive static pools of one-year lengths, such as April 2000-April 2001; May 2000-May 2001; June 2000-June 2001 and so on. On the other hand, a firm first appearing on April 1, 2002, and having an outstanding rating until May 1, 2003, will appear only in the

April 2002-April 2003 and May 2002-May 2003 static pools of one-year lengths. Static pools of two- and three-year lengths are formed in a similar manner.

Weighted average marginal default rate

Notations:

For data of CRISIL Ratings,

M: Month of formation of the static pool (1988-2020)

R: A given rating category on the rating scale ('CRISIL AAA'- 'CRISIL C')

t: Length of the static pool in years on a rolling basis (1, 2, 3)

$P_t^M(R)$ = Defaults from rating category 'R' in the t^{th} year of the M-month static pool

$Q_t^M(R)$ = Non-defaulted ratings outstanding at the beginning of the t^{th} year in the rating category R from the M-month static pool

Illustration[10]: Consider a hypothetical static pool formed in April 2000 and with 100 companies outstanding at a rating of 'CRISIL BB' at the beginning of the month. If there is one default in the pool in the first year (2000), three in the second (2001) and none in the third (2002), with no withdrawals in any year, then:

$P_1^{April\text{-}2000}(CRISIL\ BB) = 1$; $P_2^{April\text{-}2000}(CRISIL\ BB) = 3$; and $P_3^{April\text{-}2000}(CRISIL\ BB) = 0$

$Q_1^{April\text{-}2000}(CRISIL\ BB) = 100$; $Q_2^{April\text{-}2000}(CRISIL\ BB) = 99$; and $Q_3^{April\text{-}2000}(CRISIL\ BB) = 96$

For rating category R, the t^{th} year marginal default rate for the M-month static pool is the probability of a firm in the static pool formed in the month M, not defaulting until the end of period (t-1) and defaulting only in year t.

Mathematically, the marginal default rate for category 'R' in year t from the M-month static pool $\mathbf{MDR_t^M(R)}$ is defined as

$MDR_t^M(R) = P_t^M(R)/Q_t^M(R)$

Therefore, $MDR_1^{April\text{-}2000}(CRISIL\ BB) = P_1^{April\text{-}2000}(CRISIL\ BB)/Q_1^{April\text{-}2000}(CRISIL\ BB) = 1/100 = 0.01$

The average marginal default rate is calculated as the weighted average of the marginal default rates of all the static pools of similar lengths in the period, with the number of ratings outstanding at the beginning of the period (with appropriate withdrawal adjustments discussed later) as weights.

[10] This illustration is for explanation only and does not indicate the actual or observed default rates in any rating category.

Cumulative average default rate

Survival analysis is used to compute cumulative default probabilities. Using the average marginal default rate, the cumulative probability of a firm defaulting is calculated as follows:

Cumulative probability of a firm defaulting by the end of (t+1) years	=	[Cumulative probability of the firm defaulting by the end of t years + Probability of the firm defaulting in the $(t+1)^{th}$ year]

Furthermore, for a firm to default in the $(t+1)^{th}$ year, it should survive until the end of t years. So,

Probability of the firm defaulting in the $(t+1)^{th}$ year	=	[Probability of the firm not defaulting until the end of the t^{th} year * Marginal probability of the firm defaulting in the $(t+1)^{th}$ year]

Now,

Probability of the firm not defaulting until the end of the t^{th} year	=	1- Cumulative probability of the firm defaulting by the end of t years

Hence,

Probability of the firm defaulting in $(t+1)^{th}$ year	=	[(1- Cumulative probability of the firm defaulting by the end of t years) * Marginal probability of the firm defaulting in the $(t+1)^{th}$ year]

Therefore, returning to the first expression,

Cumulative probability that a firm defaults by the end of (t+1) years	=	Cumulative probability of the firm defaulting by the end of t years	+	[(1- Cumulative probability of the firm defaulting by the end of t years) * (Marginal probability of the firm defaulting in $(t+1)^{th}$ year)]

Restating the above in notation, if **$CPD_{t+1}(R)$** = cumulative default probability of a firm rated R defaulting in t+1 years, then,

$CPD_t(R) = MDR_t(R)$; for t = 1

$CPD_{t+1}(R) = CPD_t(R) + (1 - CPD_t(R)) * MDR_{t+1}(R)$ for t = 2, 3

Withdrawal adjustment

Within a year of obtaining the rating, a firm may move to one of three states: timely payment (non-default rating outstanding), default on debt repayment, or full debt repayment and withdrawal of the rating. As firms are not monitored post withdrawal, the 'true state' (whether in default or not) of a firm whose rating has been withdrawn remains unknown in the subsequent months. Therefore, a modified $MDR_t^M(R)$ that ignores firms on which the rating is withdrawn is an appropriate measure of marginal default probability. As mentioned earlier, $Q_t^M(R)$ is also adjusted for firms that belong to the static pool and have defaulted by the beginning of year t. The modified $Q_t^M(R)$ is as follows:

$Q_t^M(R)$ = Number of firms in the static pool formed at the beginning of month M with rating category R

less Number of defaults until the end of period (t-1)

less Number of firms with ratings withdrawn until the end of period t

CRISIL Ratings uses full-year withdrawal adjustments as opposed to no withdrawal adjustment or a mid-year withdrawal adjustment, as the issuers whose ratings were withdrawn are not immune to the risk of default. Moreover, there is lack of reliable information that meets the stringent requirements of CRISIL Ratings, post withdrawal.

Post default return of a firm

Post default, firms sometimes recover and, consequently receive a non-default rating. As a credit rating by CRISIL Ratings is an indicator of the probability of default, default is considered an 'absorbing state', that is, a firm cannot come back to its original static pool post-default. In the static pool methodology, the recovered firm is considered a new firm, which—if it continues to be rated—appears in the static pool of the month in which it recovered.

Methodology for transition rates

The t-year transition rate (from rating R1 to rating R2) for a static pool is the proportion of firms rated R1 at the beginning of the static pool that are found to be in R2 at the end of t years. This proportion is called the t-year transition probability from R1 to R2. The t-year transition matrix is formed by computing transition probabilities from various rating categories (except 'CRISIL D') to other rating categories.

Withdrawal-adjusted transition rates are computed as mentioned above but excluding firms on which the rating has been withdrawn at the end of t years. Ratings at a point of time and at the end of the t^{th} year are considered for the computation of t-year transition rates.

How CRISIL Ratings treats non-cooperative issuers

The SEBI circular *'Enhanced standards for credit rating agencies (CRAs)'* issued on November 1, 2016, makes it mandatory for CRAs to continue to rate non-cooperative issuers on a best-effort basis. To highlight non-cooperation, SEBI has insisted that all such ratings use the suffix 'issuer not cooperating'[11]. CRISIL Ratings uses its criteria for assessing information adequacy risk for arriving at credit ratings that are commensurate with the extent of information received from issuers that CRISIL Ratings categorises as non-cooperative.

In computing default and transition rates in this study, all such issuers (except defaulters) are removed from the static pools in the subsequent months (treatment similar to a withdrawn rating) because such ratings lack a forward-looking perspective, as they are arrived at without any interaction with the management and are based on best available, limited or dated information about the firm.

If a firm defaults after being classified as 'issuer not cooperating', it is treated as a defaulter from its last cooperative rating.

Consider, for instance, company ABC, with an outstanding rating of 'CRISIL BB' as on March 31, 2016. ABC turns non-cooperative, and the rating is migrated to 'CRISIL B; Issuer not cooperating' in April 2017. In June 2017, assume that CRISIL Ratings comes to know — either from the banker or from sources in the public domain — of delays by ABC in debt servicing. The rating is then downgraded to 'CRISIL D; Issuer not cooperating'. In computing default statistics, ABC will, therefore, be considered as having defaulted from 'CRISIL BB' and not 'CRISIL B'.

CRISIL Ratings has published the default and transition statistics, including ratings on non-cooperative issuers, in *Annexure 6*. It should be noted that for the computation of these default and transition statistics, the static pool for December 2016 does not include non-cooperative issuers, as SEBI had mandated that all CRAs categorise issuers in the 'issuer not cooperating category' from January 2017 onwards.

[11] SEBI had, in its original circular, directed CRAs to append 'Issuer did not cooperate; based on best available information' with the rating symbol in the same font size for non-cooperative issuers. However, in a joint representation to SEBI, CRAs clarified that for the sake of brevity, they will use the suffix 'Issuer not cooperating'. This will be followed by an asterisk mark, which will read as 'Issuer did not cooperate; based on best available information'.

Table A20: Various approaches to computing default rates

Withdrawal adjustments	**Approach 1: Full-year withdrawal adjustments** Exclude all ratings withdrawn during a year from the base in calculating default rates. **Approach 2: Mid-year withdrawal adjustments** Exclude half of the ratings withdrawn during a year from the base in calculating default rates. **Approach 3: No withdrawal adjustments** Take all ratings outstanding at the beginning of a year as the base even though some are withdrawn during the year.	CRISIL Ratings follows Approach 1, as it believes issuers whose ratings are withdrawn are not immune to the risk of default after withdrawal. Reliable information about the timeliness of debt repayment, which meets the stringent requirements of CRISIL Ratings, is not available post withdrawal of the rating. Approach 1 results in the most conservative estimate of default rates among the three.
Calculating CDR	**Approach 1: Calculate CDR directly, without using the marginal default rate** Calculate CDR over a period as a ratio of the number of firms defaulting to the number of firms at the beginning of the period, ignoring intra-period withdrawals. **Approach 2: Average marginal default rate methodology** Calculate the marginal default rate, weigh it by sample size and accumulate it over a period to arrive at the average CDR.	CRISIL Ratings follows Approach 2 and takes into account only the ratings that are not withdrawn at the end of each year as base. This results in a more accurate and conservative estimate of the default rates. Approach 1 is not comprehensive, as it ignores a large portion of the credit history of firms that may have been rated soon after the static pool was formed.
Post-default return of a firm	**Approach 1: Treat default as an 'absorbing state'** Retain the status of a defaulted firm as default even after recovery. Treat the recovered firm as a new firm from the point of recovery. **Approach 2:** Treat a defaulted and subsequently recovered firm as a non-defaulted firm from the point of recovery. So, if a non-defaulted firm defaults in the second year and recovers in the third year, it will not be treated as a defaulted firm in the third year marginal default rate calculation.	CRISIL Ratings follows Approach 1. As credit ratings are an opinion on the likelihood of default, the default state is treated as an absorbing state or an end point, and the firm's rating continues to be in 'default'. If a firm emerges from default and has a non-default rating on its debt instruments, it is treated as a new firm and part of a different static pool from the time its rating is revised from 'CRISIL D'.
Data pooling	**Approach 1: Static pool** Charge defaults against all the ratings of the issuer during the period. **Approach 2:** Charge defaults against the initial rating of the issuer. **Approach 3:** Charge defaults against the most recent year's rating of the issuer.	CRISIL Ratings follows Approach 1. Debt instruments are tradable and can be held by different investors at different points of time. As credit ratings—which convey an opinion on the likelihood of default—are intended to benefit investors through the life of the instrument, CRISIL Ratings believes charging defaults against all the ratings of the issuer during the period is the most appropriate approach in computing default rates. Other approaches may have limited utility. For instance, Approach 2 may be relevant only to an investor who invests in the first-rated debt issuance of a firm and holds it to maturity. Approach 3 may be relevant only to an investor who happens to be holding the instrument just a year prior to its default.

Notes

About CRISIL Ratings Limited (A subsidiary of CRISIL Limited)

CRISIL Ratings pioneered the concept of credit rating in India in 1987. With a tradition of independence, analytical rigour a nd innovation, we set the standards in the credit rating business. We rate the entire range of debt instruments, such as, bank loans, certificates of deposit, commercial paper, non-convertible / convertible / partially convertible bonds and debentures, perpetual bonds, bank hybrid capital instruments, ass et-backed and mortgage-backed securities, partial guarantees and other structured debt instruments. We have rated over 33,000 large and mid-scale corporates and financial institutions. We have also instituted several innovations in India in the rating business, including rating municipal bonds, partially guaranteed instruments and infrastructure investment trusts (InvITs).

CRISIL Ratings Limited ("CRISIL Ratings") is a wholly-owned subsidiary of CRISIL Limited ("CRISIL"). CRISIL Ratings Limited is registered in India as a credit rating agency with the Securities and Exchange Board of India ("SEBI").

For more information, visit www.crisilratings.com

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