

Default, Transition, and Recovery:

2022 Annual Taiwan Ratings Corp. Corporate Default And Rating Transition Study

April 27, 2023

Key Takeaways

- There were no defaults among corporate issuers rated by Taiwan Ratings Corp. (TRC) for the sixth straight year.
- The percentage of upgrades (out of all ratings) fell to 5.4% in 2022 from 10.3% in 2021. The percentage of downgrades rose to 1.8% in 2022 from zero in 2021. Both were below their historical averages from 1999 to 2022--10.0% for upgrades and 4.4% for downgrades.
- The stability rate--the percentage of ratings that were the same at the end of the year as they were at the start--rose to 89.3% in 2022 from 87.2% in 2021. Last year's rate was much higher than the historical average stability rate of 79.1% from 1999 to 2022.
- TRC's ratings continue to clearly correspond with default remoteness, with default rates among investment-grade ratings well below those among speculative-grade ratings across all time frames, consistent with S&P Global Ratings' global scale ratings.

This default and rating transition study closely examines the history of the 344 corporate issuer credit ratings that TRC has assigned since its operations began in 1998. We primarily measure rating migration over time and provide quantitative measures of rating distribution and movement. Ratings covered in this study are those on Taiwan-based obligors in the nonfinancial, utility, insurance, and financial services sectors. These include publicly and confidentially rated entities, as well as those with ratings that were later withdrawn.

The default risks for S&P Global Ratings' global scale ratings and the ratings on TRC's scale, which is a national scale, differ. National scale credit ratings are calibrated to better distinguish the relative credit risk within a country. (S&P Global Ratings raised the long-term issuer credit ratings on Taiwan in April 2022 to 'AA+', with a stable outlook, from 'AA'.) Because of the differences between the two rating scales, we do not make any direct comparisons between S&P Global Ratings' and TRC's ratings in this report. However, both rating scales generally work from the same principle: Higher ratings exhibit lower default rates and greater stability than lower ratings.

The number of TRC ratings tracked in this study over the years has been small but meaningful, starting at 33 active ratings in 1999 and increasing to 168 by the start of 2022 (see chart 1). Last year started with all ratings in the investment-grade categories, from 'twAAA' down to 'twBBB'--the 10th straight year that has happened. (The beginning of 2001 was the high mark for TRC's speculative-grade ratings; they comprised 37% of all ratings.) The largest categories to start 2022 were 'twAA', with 84 ratings,

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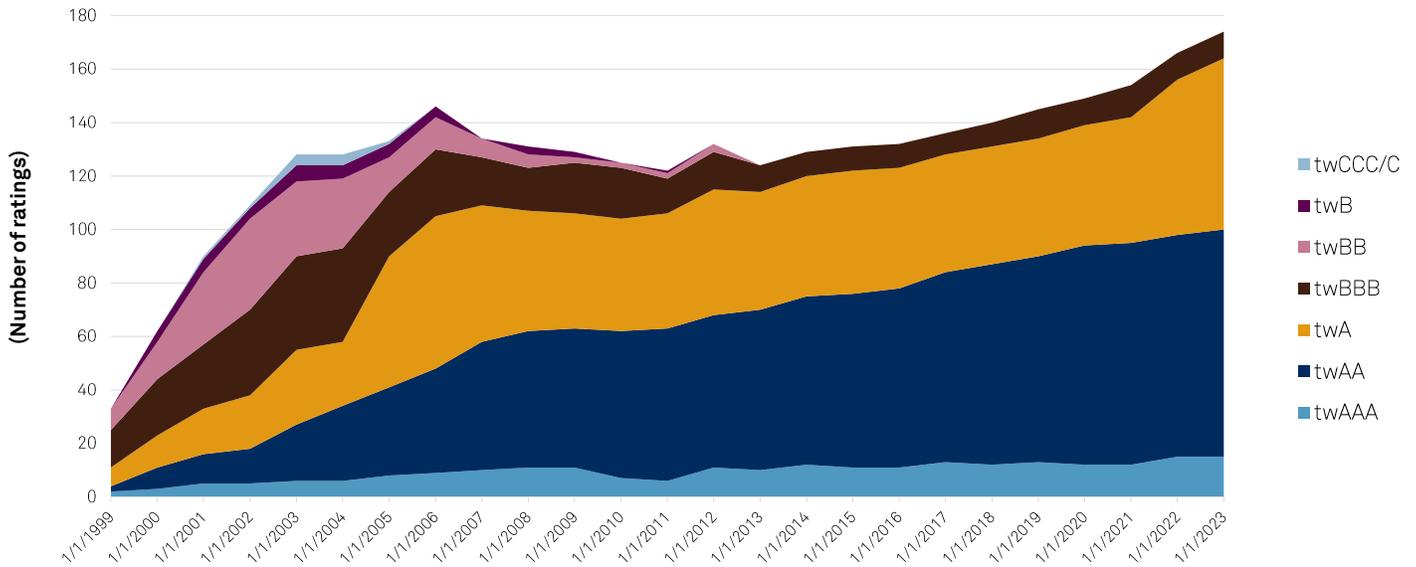
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followed by 'twA', with 58. There was also an all-time high of 16 'twAAA' ratings at the start of 2022, up from 13 at the start of 2021.

Chart 1

Distribution Of Corporate Ratings On Taiwan National Scale



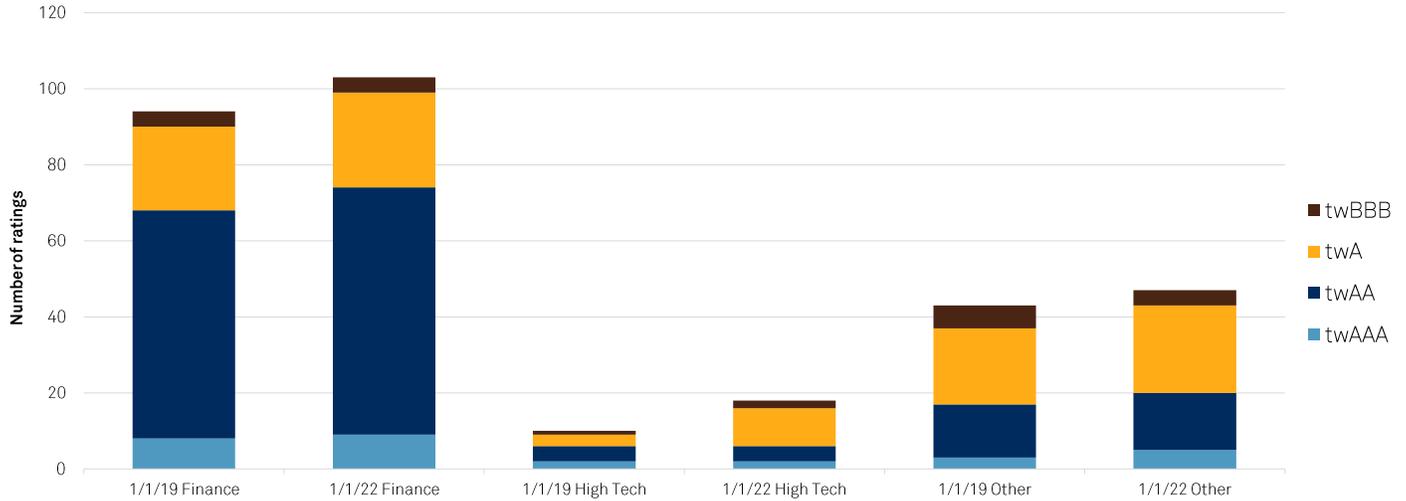
Source: S&P Global Ratings Research. Data as of January 1, 2022.

Distribution Of Ratings By Sector

TRC's national scale ratings are dominated by the financial services sector, with 29 banks, 23 finance companies, and 16 brokerage companies representing 39% of all issuers, and insurance companies making up an additional 16%. High technology recently replaced chemicals as the largest nonfinancial sector after the addition of 11 new high technology issuers over the past two years (see chart 2).

Chart 2

Distribution Of Taiwan National Scale Ratings By Sector (2019 And 2022)



There were 11 new issuers in Taiwan in 2022, down from 13 in 2021 (see table 1). Half of the new nonfinancial issuers in 2022 were high technology companies, following on from 2021, when all six new nonfinancial issuers came from the high technology sector.

Table 1

New Issuer Sector Breakdown

(Number of issuers)	Financial institutions	Industrials and utilities	Total
1/1/1998	31	2	33
1/1/1999	24	5	29
1/1/2000	26	5	31
1/1/2001	8	14	22
1/1/2002	27	9	36
1/1/2003	8	8	16
1/1/2004	6	9	15
1/1/2005	10	9	19
1/1/2006	7	8	15
1/1/2007	10	3	13
1/1/2008	7	2	9
1/1/2009	2	3	5
1/1/2010	1	5	6
1/1/2011	4	4	8
1/1/2012	3	2	5
1/1/2013	7	1	8

1/1/2014	2	5	7
1/1/2015	2	3	5
1/1/2016	3	1	4
1/1/2017	1	7	8
1/1/2018	1	6	7
1/1/2019	4	6	10
1/1/2020	3	6	9
1/1/2021	3	10	13
1/1/2022	4	7	11
Total	204	140	344
% of total	59.3	40.7	100.0

Source: S&P Global Ratings Research.

Taiwan's Economy Is Projected To Expand

The Taiwanese economy expanded by an estimated 2.2% in 2022, and S&P Global economists currently project 1.5% growth in 2023, followed by 2.5% growth in 2024 (see "Asia-Pacific Sovereign Rating Trends 2023: A Break In The Weather," Jan. 26, 2023). In line with these projections, our rating outlook on Taiwan is stable, with demand for Taiwan's semiconductor exports outweighing issues associated with long-standing geopolitical tensions. The largest downside risks are slowing economic growth and a deterioration of cross-strait relations with China. Surprises to the upside could happen with a material easing of those cross-strait tensions.

Ratings Mixed In 2022

To analyze rating performance during the year, we look at TRC's ratings at the start of the year and at year-end. During 2022, there were nine upgrades (down from 16 in 2021) and three downgrades (up from zero), with no defaults (see table 2). This was the sixth year in a row with no defaults. The long-term weighted average of defaults per year is 0.4%.

The upgrade rate fell to 5.4% in 2022 from 10.3% in 2021, while the downgrade rate rose to 1.8% in 2022 from zero in 2021. Both were below their long-term weighted averages of 10.0% for upgrades and 4.4% for downgrades. The stability rate rose to 89.3% in 2022 from 87.2% in 2021 and was higher than the long-term weighted average of 79.1%. This stability rate in 2022 was the highest it has been since 2014, when 91.5% of ratings were stable. The ratio of downgrades to upgrades was 0.3 to 1 in 2022; the ratio was zero in 2021 because there were no downgrades. Historically, there have been 1.7 downgrades for every upgrade.

Of the upgrades in 2022, six were of corporates and three were of financial institutions and insurers. Notably, TRC upgraded one issuer, Taiwan Cooperative Bank Ltd., to 'twAAA' from 'twAA+' in May, and it downgraded another issuer, Tokio Marine Nawa Insurance Co. Ltd., to 'twAA' from 'twAAA' in September.

Table 2

Summary Of Annual Rating Changes In Taiwan (1999-2022)

Year	Issuers as of Jan. 1	Upgrades (%)	Downgrades (%)*	Defaults (%)	Withdrawn ratings (%)	Unchanged ratings (%)	Changed ratings (%)	Downgrade/upgrade ratio
1/1/1999	33	9.1	0.0	0.0	0.0	90.9	9.1	0.0
1/1/2000	62	3.2	12.9	1.6	3.2	79.0	21.0	4.0
1/1/2001	90	2.2	11.1	0.0	3.3	83.3	16.7	5.0
1/1/2002	109	16.5	18.3	0.0	13.8	51.4	48.6	1.1
1/1/2003	129	15.5	3.9	0.0	14.0	66.7	33.3	0.3
1/1/2004	129	58.1	2.3	0.0	8.5	31.0	69.0	0.0
1/1/2005	134	14.2	0.7	0.7	5.2	79.1	20.9	0.1
1/1/2006	147	15.6	2.7	0.7	17.0	63.9	36.1	0.2
1/1/2007	135	17.8	4.4	3.7	6.7	67.4	32.6	0.3
1/1/2008	132	4.5	4.5	1.5	5.3	84.1	15.9	1.0
1/1/2009	130	0.8	17.7	0.0	9.2	72.3	27.7	23.0
1/1/2010	126	4.8	3.2	0.0	7.1	84.9	15.1	0.7
1/1/2011	123	12.2	5.7	0.0	2.4	79.7	20.3	0.5
1/1/2012	133	3.0	3.0	0.0	11.3	82.7	17.3	1.0
1/1/2013	125	6.4	3.2	0.0	4.0	86.4	13.6	0.5
1/1/2014	130	3.1	1.5	0.0	3.8	91.5	8.5	0.5
1/1/2015	133	6.0	3.0	0.0	3.0	88.0	12.0	0.5
1/1/2016	134	6.0	3.0	0.7	1.5	88.8	11.2	0.5
1/1/2017	138	6.5	0.0	0.0	4.3	89.1	10.9	0.0
1/1/2018	141	10.6	0.0	0.0	3.5	85.8	14.2	0.0
1/1/2019	147	4.8	3.4	0.0	4.1	87.8	12.2	0.7
1/1/2020	151	2.0	6.6	0.0	4.0	87.4	12.6	3.3
1/1/2021	156	10.3	0.0	0.0	2.6	87.2	12.8	0.0
1/1/2022	168	5.4	1.8	0.0	3.6	89.3	10.7	0.3
Weighted average (1999-2022)		10.0	4.4	0.4	6.1	79.1	20.9	1.7

*Excludes downgrades to 'D', shown separately in default column. Note: Rating changes measured from rating as of Jan. 1 to rating as of Dec. 31 exclude all intermediate rating changes. Source: S&P Global Ratings Research.

Over the full year, there were four rating actions in which the rating category changed (see table 3). One was the downgrade of Tokio Marine Nawa Insurance Co. Ltd. The others were upgrades:

- The upgrade of Taiwan Cooperative Bank Ltd.,
- The upgrade of Yang Ming Marine Transport Corp. to 'twA-' from 'twBBB+' in April, and
- The upgrade of one entity with a confidential rating.

Table 3

Rating Transitions On Taiwan National Scale In 2022

From/to	Total	twAAA	twAA+	twAA	twAA-	twA+	twA	twA-	twBBB+	twBBB	twBBB-	twBB+	twBB	twBB-	twB+	twB	twB-	twCCC/ C	D	NR	
twAAA	16	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
twAA+	22	1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twAA	27	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
twAA-	35	0	0	3	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twA+	26	0	0	0	1	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twA	16	0	0	0	0	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twA-	16	0	0	0	0	0	2	12	0	0	0	0	0	0	0	0	0	0	0	0	2
twBBB+	9	0	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	1
twBBB	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
twBBB-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twBB+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twBB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twBB-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twB+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twB-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twCCC/C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

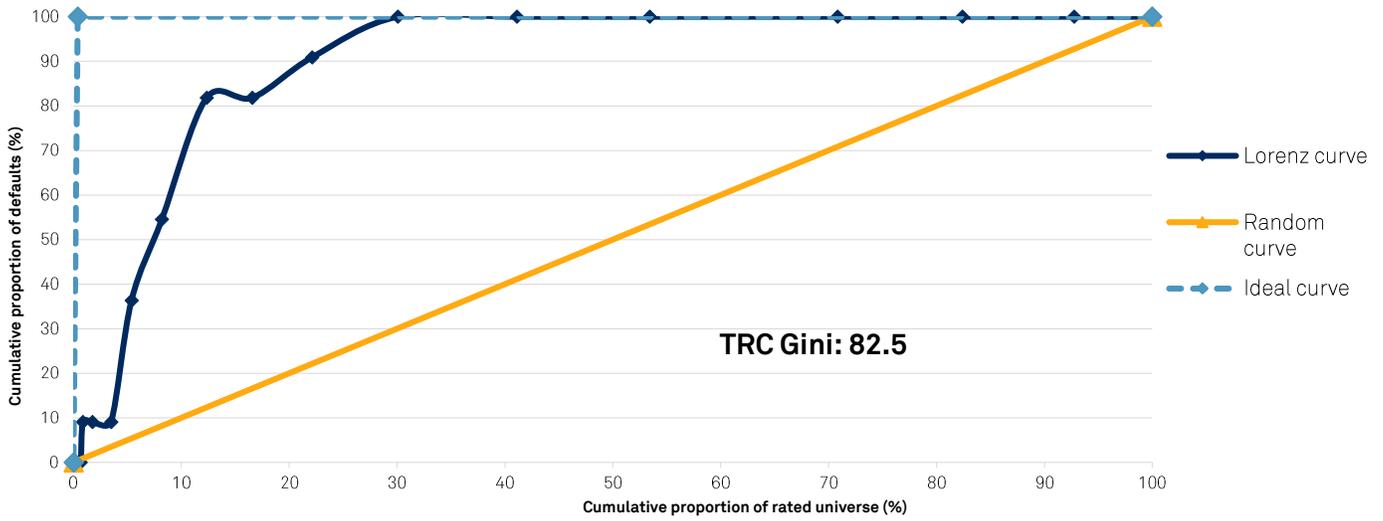
Source: S&P Global Ratings Research. Data as of Jan. 1, 2023

Lorenz Curves And Gini Coefficients

Gini coefficients measure the rank-ordering power of ratings over a given time horizon. They are ratios of actual rank-ordering performance to theoretically perfect rank ordering. Over each timespan, lower TRC ratings correspond to higher default rates (see charts 3-5). For example, in the one-year Lorenz curve, 54.6% of defaults occurred in the speculative-grade rating categories, while speculative-grade ratings constituted only 7.7% of all corporate ratings. If the rank ordering of ratings had little predictive value, the cumulative share of defaulting corporate entities and the cumulative share of all entities at each rating would be nearly the same, producing a Gini coefficient of zero (see "Appendix II: Gini Methodology").

Chart 3

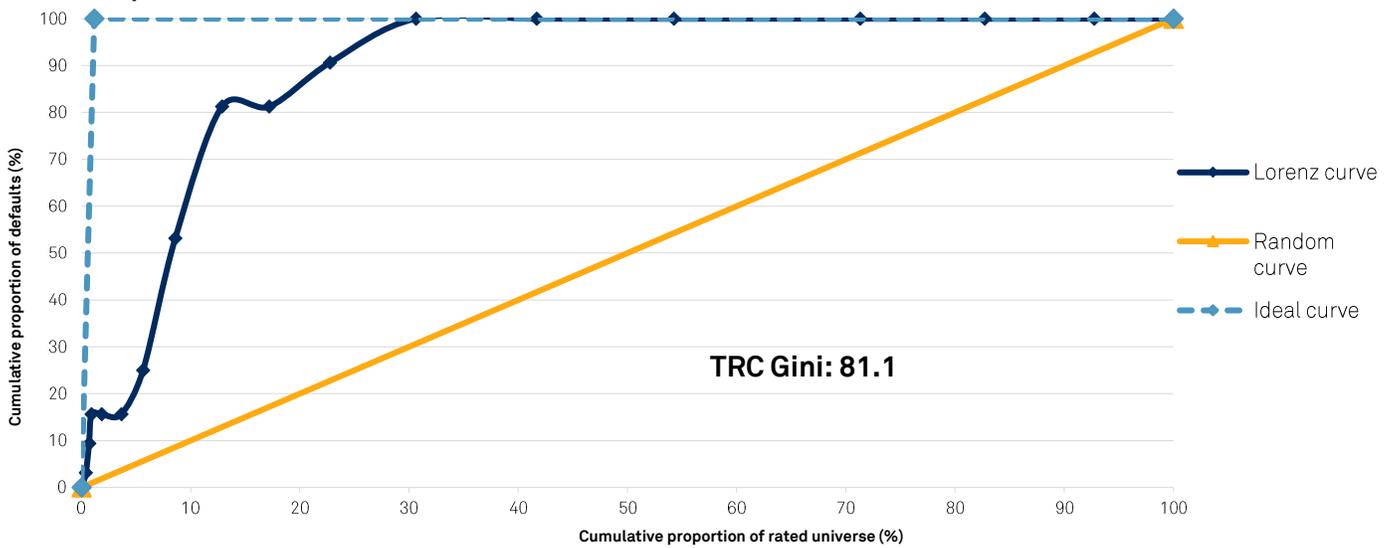
Taiwan Corporate One-Year Lorenz Curve And Gini Coefficient



Source: S&P Global Ratings Research. Data as of January 1, 2022.

Chart 4

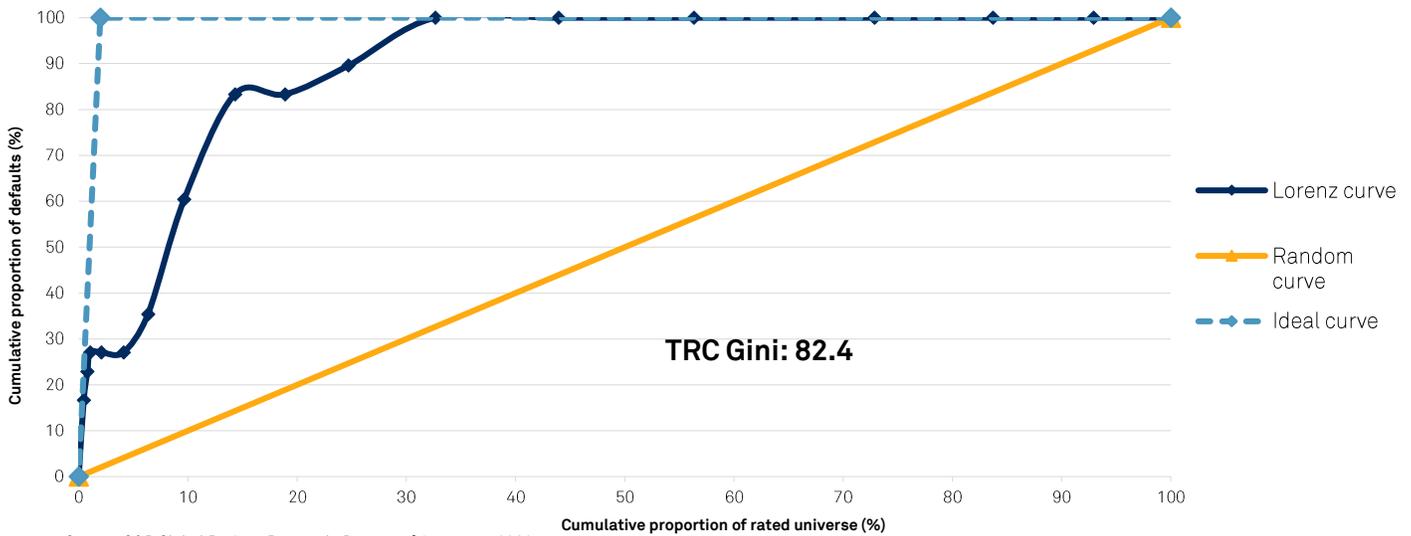
Taiwan Corporate Three-Year Lorenz Curve And Gini Coefficient



Source: S&P Global Ratings Research. Data as of January 1, 2022.

Chart 5

Taiwan Corporate Five-Year Lorenz Curve And Gini Coefficient



Source: S&P Global Ratings Research. Data as of January 1, 2022.

Ratings And Cumulative Default Rates Remained Negatively Correlated

This study found that defaults and ratings are negatively correlated, consistent with all of S&P Global Ratings Credit Research & Insights' default studies. The higher the rating, the lower the incidence of default. This relationship remains true even for a smaller rated population, as is the case with TRC ratings.

One exception is the 'twCCC'/'twCC' category due to its very small data set, for which there is no default activity until the three-year horizon (see table 4). However, by year four, this category's default rate is well above the 'twB' category's--in line with expectations. Overall, there have been 11 total defaults among TRC-rated issuers, but only one since 2008.

Table 4

Taiwan Cumulative Average Default Rates 1999-2022

(%)	--Time horizon (years)--									
	1	2	3	4	5	6	7	8	9	10
twAAA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
twAA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
twA	0.1	0.2	0.3	0.5	0.6	0.7	0.9	0.9	0.9	0.9
twBBB	1.0	2.2	3.0	3.6	3.6	3.8	4.4	5.0	5.6	5.6
twBB	2.7	4.9	6.6	7.1	8.7	10.4	12.0	13.1	13.7	13.7
twB	2.6	7.7	10.3	10.3	12.8	15.4	20.5	25.6	28.2	28.2
twCCC/C	0.0	0.0	9.1	45.5	72.7	90.9	100.0	N/A	N/A	N/A
Investment-grade	0.2	0.4	0.6	0.7	0.7	0.8	1.0	1.1	1.2	1.2
Speculative-grade	2.6	5.2	7.3	9.4	12.4	15.0	17.6	19.3	20.2	20.2
All rated	0.4	0.8	1.1	1.4	1.8	2.1	2.5	2.8	3.1	3.1

Data as of Jan. 1, 2023. N/A--Not applicable. Source: S&P Global Ratings Credit Research & Insights.

Transition Matrices

Transition matrices show how ratings behave over time, including movements to other rating categories, movements to default, and rating withdrawals (see tables 5-8). The results presented here are consistent with other S&P Global Ratings Credit Research & Insights default studies in that there is a clear correspondence between higher ratings and lower default activity.

Rating stability is also generally higher among investment-grade ratings than speculative-grade ratings. For example, over a one-year time frame, an average of 95.7% of 'twAA' rated issuers maintained this rating, higher than the 59.6% of 'twBB' rated issuers that maintained that rating.

This general relationship is also true over longer horizons. When analyzing transition matrices that present averages computed over multiple static pools, the standard deviations associated with each transition point in the matrix are large relative to the averages (outside of stability rates).

Table 5

Average One-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2022)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	89.4	5.8	0.0	0.0	0.0	0.0	0.0	0.0	4.9
	(12.0)	(10.9)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(5.2)
twAA	1.5	95.7	0.7	0.0	0.0	0.0	0.0	0.0	2.1
	(1.7)	(2.9)	(1.2)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(1.9)
twA	0.0	5.5	89.1	1.6	0.1	0.0	0.0	0.1	3.6
	(0.0)	(5.5)	(6.5)	(2.6)	(0.4)	(0.0)	(0.0)	(0.4)	(3.4)
twBBB	0.0	0.2	8.4	75.1	1.2	0.0	0.0	1.0	14.0
	(0.0)	(1.0)	(19.2)	(20.9)	(1.9)	(0.0)	(0.0)	(3.0)	(11.2)
twBB	0.0	0.0	0.5	12.6	59.6	0.5	0.5	2.7	23.5
	(0.0)	(0.0)	(1.4)	(17.8)	(27.2)	(2.8)	(1.2)	(6.8)	(17.3)
twB	0.0	0.0	0.0	0.0	7.7	46.2	7.7	2.6	35.9
	(0.0)	(0.0)	(0.0)	(0.0)	(9.8)	(31.8)	(17.0)	(9.4)	(35.8)
twCCC/CC	0.0	0.0	0.0	0.0	36.4	0.0	63.6	0.0	0.0
	(0.0)	(0.0)	(0.0)	(0.0)	(45.2)	(0.0)	(45.2)	(0.0)	(0.0)

Data as of January 1, 2022. Source: S&P Global Ratings Research.

Table 6

Average Three-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2022)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	74.1	14.2	0.5	0.0	0.0	0.0	0.0	0.0	11.2
	(18.5)	(19.4)	(2.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(8.6)
twAA	3.5	89.5	1.7	0.0	0.0	0.0	0.0	0.0	5.3
	(3.3)	(4.3)	(1.5)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(2.4)
twA	0.0	14.3	71.8	3.5	0.5	0.0	0.0	0.4	9.6
	(0.0)	(10.0)	(10.5)	(4.3)	(1.2)	(0.0)	(0.0)	(0.8)	(4.7)
twBBB	0.0	2.6	18.0	45.6	1.8	0.0	0.0	3.1	28.9
	(0.0)	(3.6)	(24.8)	(25.0)	(3.6)	(0.0)	(0.0)	(5.2)	(13.9)
twBB	0.0	0.0	5.5	24.0	18.6	0.0	1.1	6.6	44.3
	(0.0)	(0.0)	(8.0)	(14.5)	(21.0)	(0.0)	(2.3)	(13.9)	(16.9)
twB	0.0	0.0	2.6	2.6	5.1	2.6	15.4	10.3	61.5
	(0.0)	(0.0)	(6.3)	(8.0)	(9.9)	(6.3)	(26.0)	(12.4)	(35.1)
twCCC/CC	0.0	0.0	0.0	0.0	72.7	9.1	9.1	9.1	0.0
	(0.0)	(0.0)	(0.0)	(0.0)	(40.3)	(32.1)	(32.1)	(13.4)	(0.0)

Data as of Jan. 1, 2022. Source: S&P Global Ratings Research.

Table 7

Average Five-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2022)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	67.3	18.7	0.0	0.0	0.0	0.0	0.0	0.0	14.0
	(20.1)	(20.9)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(9.2)
twAA	4.4	84.9	2.0	0.0	0.0	0.0	0.0	0.0	8.6
	(4.8)	(5.1)	(1.2)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(2.3)
twA	0.0	20.7	59.9	3.1	0.4	0.0	0.0	0.7	15.2
	(0.0)	(12.2)	(13.2)	(3.4)	(1.0)	(0.0)	(0.0)	(1.0)	(7.4)
twBBB	0.0	6.3	22.9	30.0	0.3	0.0	0.0	3.9	36.6
	(0.0)	(6.5)	(26.4)	(19.9)	(1.4)	(0.0)	(0.0)	(5.3)	(16.6)
twBB	0.0	1.1	7.7	20.2	3.8	0.0	0.0	8.7	58.5
	(0.0)	(1.6)	(7.8)	(12.8)	(4.1)	(0.0)	(0.0)	(13.2)	(15.5)
twB	0.0	0.0	2.6	0.0	12.8	0.0	2.6	12.8	69.2
	(0.0)	(0.0)	(7.0)	(0.0)	(20.0)	(0.0)	(8.0)	(12.6)	(32.9)
twCCC/CC	0.0	0.0	0.0	0.0	18.2	9.1	0.0	72.7	0.0
	(0.0)	(0.0)	(0.0)	(0.0)	(43.1)	(13.4)	(0.0)	(40.3)	(0.0)

Data as of January 1, 2022. Source: S&P Global Ratings Research.

Table 8

Average 10-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2022)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	53.6	33.6	0.0	0.0	0.0	0.0	0.0	0.0	12.7
	(23.8)	(18.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(9.6)
twAA	5.0	78.2	3.0	0.0	0.0	0.0	0.0	0.0	13.9
	(3.3)	(3.4)	(1.9)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(3.0)
twA	0.0	29.6	40.8	2.8	0.0	0.0	0.0	1.3	25.5
	(0.0)	(9.4)	(9.2)	(2.1)	(0.0)	(0.0)	(0.0)	(1.0)	(10.1)
twBBB	0.9	12.2	17.9	18.5	0.0	0.0	0.0	5.6	44.8
	(1.4)	(7.1)	(17.3)	(10.8)	(0.0)	(0.0)	(0.0)	(6.6)	(17.0)
twBB	0.0	2.2	3.3	6.0	0.0	0.0	0.0	13.7	74.9
	(0.0)	(2.5)	(3.6)	(5.5)	(0.0)	(0.0)	(0.0)	(11.7)	(8.3)
twB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.2	71.8
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(31.1)	(31.1)
twCCC/CC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)

Data as of Jan. 1, 2022. Source: S&P Global Ratings Research.

Appendix I: Default Methodology And Definitions

An issuer credit rating reflects TRC's opinion of a company's overall capacity to pay its obligations (that is, its fundamental creditworthiness). This opinion focuses on the obligor's ability and willingness to meet its financial commitments on a timely basis, and it generally indicates the likelihood of default regarding all financial obligations of the firm. It is not necessary for a company to have rated debt in order to be assigned an issuer credit rating.

Specific issues are typically rated as high as or lower than the issuer credit rating, depending on their relative priority within the company's debt structure. For lower-rated entities, the issuer credit ratings are generally two notches higher than the subordinated debt ratings; otherwise, they are generally one notch higher. Therefore, though a 'twBB+' issuer credit rating is generally paired with a 'twBB-' subordinated debt rating, a 'twAA' issuer credit rating usually corresponds to a 'twAA-' subordinated debt rating.

Our ongoing enhancement of the default database used to generate this study may lead to outcomes that differ to some degree from those reported in previous studies. However, this poses no continuity problem because each study reports statistics back to Dec. 31, 1998. Therefore, each annual default study is self-contained and effectively supersedes all previous versions.

Issuers included in this study

This study analyzes the rating histories of 344 companies to which TRC had assigned ratings as of Dec. 31, 1998, or that were first rated between that date and Dec. 31, 2022. These include industrials, utilities, insurance companies, financial holding companies, banks, securities firms, and other financial services companies in Taiwan with long-term credit ratings. The study includes publicly and confidentially rated

entities, as well as those with ratings that were withdrawn after initial assignment. The analysis excludes public information ("pi") ratings and ratings based on the guarantee of another company. Structured finance vehicles, public-sector issuers, and sovereign issuers are the subjects of separate default and transition studies and are excluded from this study.

To avoid overcounting, we exclude subsidiaries with debt that is fully guaranteed by a parent or with default risk that is considered identical to that of a parent, where both the parent and subsidiaries have Taiwan national scale ratings. The latter are companies with obligations that are not legally guaranteed by a parent but that have operating or financing activities that are so inextricably entwined with those of the parent that it would be impossible to imagine the default of one and not the other. At times, however, some of these subsidiaries might not have been covered by a parent's guarantee, or the relationship that combines the default risk of parent and subsidiary might have come to an end or might not have begun. We include such subsidiaries for the period during which they had distinct and separate risk of default.

Definition of default

A default event is recorded on the first occurrence of a payment default on any financial obligation, rated or unrated, other than a financial obligation subject to a bona fide commercial dispute; an exception occurs when an interest payment missed on the due date is made within the grace period. Preferred stock is not considered a financial obligation; thus, a missed preferred stock dividend is not normally equated with default. However, we consider distressed exchanges to be defaults whenever the debtholders are coerced into accepting substitute instruments with lower coupons, longer maturities, or any other diminished financial terms.

TRC will usually lower an issue rating to 'D' (default) following a company's default on the corresponding obligation. In addition, 'SD' (selective default) is used whenever it is believed that an obligor that has selectively defaulted on a specific issue or class of obligations will continue to meet its payment obligations on other issues or classes of obligations in a timely matter. An 'R' (regulatory intervention) issuer rating indicates that an obligor is under regulatory supervision owing to its financial condition. This does not necessarily indicate a default event, but the regulator may have the power to favor one class of obligations over others or pay some obligations and not others.

We deem 'D', 'SD', and 'R' issuer ratings to be defaults for the purposes of this study. A default is assumed to have taken place on the earliest of:

- The date TRC revised the ratings to 'D', 'SD', or 'R';
- The date when a debt payment was missed;
- The date a distressed exchange offer was announced; or
- The date the debtor filed for or was forced into bankruptcy.

Static pool methodology

We conduct our default studies on the basis of groupings called static pools. These are formed by grouping issuers by rating category at the beginning of each year covered by the study. Each static pool is followed from that point forward. All companies included in the study are assigned to one or more static pools. When an issuer defaults, that default is assigned to all of the static pools to which the issuer belonged.

We use the static pool methodology to avoid certain pitfalls in estimating default rates. For example, this methodology ensures that default rates account for rating migration and allows them to be calculated across multiperiod time horizons. Some methods for calculating default and rating transition rates might charge defaults against only the initial rating on the issuer--ignoring more recent rating changes that supply more current information. Other methods may calculate default rates using only the most recent year's default and rating data, which may yield comparatively low default rates during periods of high rating activity because they ignore prior years' default activity.

The pools are static in the sense that their membership remains constant over time. Each static pool can be interpreted as a buy-and-hold portfolio. Because errors, if any, are corrected by every new update, and because the criteria for inclusion or exclusion of companies in the default study are subject to minor revisions as time goes by, it is not possible to compare static pools across different studies. Therefore, every update revises results to the same starting date of Dec. 31, 1998, to avoid continuity problems.

Entities that have had ratings withdrawn--that is, revised to not rated (NR)--are surveilled with the aim of capturing a potential default. These companies, as well as those that have defaulted, are excluded from subsequent static pools.

For instance, the 1999 static pool consists of all companies rated as of 12:01 a.m. on Jan. 1, 1999. Adding those companies first rated in 1999 to the surviving members of the 1999 static pool forms the 2000 static pool. All rating changes that took place are reflected in the newly formed 2000 static pool. This same method was used to form static pools for 2001-2022.

Consider the following example: An issuer is originally rated 'twBB' in mid-1998 and is downgraded to 'twB' in 2000. This is followed by a rating withdrawal in 2002 and a default in 2005. This hypothetical company would be included in the 1999 and 2000 pools with the 'twBB' rating assigned to it at the beginning of those years; likewise, it would be included in the 2001 and 2002 pools with the 'twB' rating. It would not be part of the 1998 pool because it was not rated as of the first day of that year, and it would not be included in any pool after the last day of 2002 because the rating had been withdrawn by then. Yet each of the four pools in which this company was included (1999-2002) would record its 2005 default at the appropriate time horizon.

Ratings are withdrawn when an entity's entire debt is paid off or when the program or programs rated are terminated and the relevant debt extinguished. Withdrawals may also occur as a result of mergers and acquisitions. Other ratings are withdrawn because of a lack of cooperation, particularly when a company is experiencing financial difficulties and refuses to provide all the information needed to continue surveillance on the ratings.

Default rate calculation

Annual default rates are calculated for each static pool, first in units and later as percentages with respect to the number of issuers in each rating category. Finally, these percentages are combined to obtain cumulative default rates for the 24 years covered by the study.

Issuer-weighted default rates

Averages that appear in this study are calculated based on the number of issuers rather than the dollar amounts affected by defaults or rating changes. Although dollar amounts provide information about the portion of the market that is affected by defaults or rating changes, issuer-weighted averages are more useful measures of the performance of ratings.

Many people in the investment field use statistics from this default study to estimate the probability of default and the probability of rating transition. It is important to note that we do not imply a specific probability of default; however, our historical default rates are frequently used to estimate these characteristics.

Average cumulative default rate calculation

Cumulative default rates that average the experience of all static pools are derived by calculating marginal default rates, conditional on survival (survivors being nondefaulters), for each possible time horizon and for each static pool; weight-averaging the conditional marginal default rates; and then accumulating the average conditional marginal default rates. Conditional default rates are calculated by dividing the number of issuers in a static pool that defaulted within a specific time horizon by the number of issuers that survived (did not default) to that point in time. Weights are based on the number of issuers in each static pool. Cumulative default rates are one minus the product of the proportion of survivors (nondefaulters).

Time sample

This update limits the reporting of default rates to the selected time horizon; however, the data has been gathered for 25 years, and all calculations are based on the rating experience of that period. The maturities of most obligations are much shorter than the selected time horizon. In addition, average default statistics become less reliable at longer time horizons because the sample size becomes smaller and the cyclical nature of default rates increases its effect on averages.

Default patterns share broad similarities across all static pools, suggesting that TRC's rating standards have been consistent over time. Adverse business conditions tend to coincide with default upswings for all pools. Speculative-grade issuers have been hit the hardest by these upswings, but investment-grade default rates have also increased in stressful periods.

Transition analysis

Transition rates compare issuer credit ratings at the beginning of a period with the ratings at the end of the period. To compute one-year rating transition rates by rating category, the rating on each entity at the end of a particular year is compared with the rating at the beginning of the same year. An issuer that remained rated for more than one year is counted as many times as the number of years it was rated. For instance, an issuer continually rated from the middle of 1998 to the middle of 2003 would appear in the four consecutive one-year transition matrices from 1999-2002. All 1999 static pool members still rated on Dec. 31, 2022, had 25 one-year transitions, while companies first rated between Jan. 1, 2022, and Dec. 31, 2022, had only one.

Each one-year transition matrix displays all rating movements between letter categories from the beginning of the year through year-end. For each rating listed in the matrix's leftmost column, there are nine ratios listed in the rows, corresponding to the ratings from 'twAAA' to 'D', plus an entry for NR.

Practical application of transition rates

Rating transition rates are useful to investors and credit professionals for whom rating stability is important. For instance, investors who are restricted by law or are inclined to invest in top-grade bonds would want to assess the likelihood that TRC analysts will continue to assign high ratings to their investments. Conversely, investors buying high-yield bonds in hopes of profiting from an upgrade would be able to gauge that expectation.

The credit community might also use rating transition information in part to determine maturity exposure limits or to measure credit risk in the context of the value-at-risk models. Rating transition matrices could also be constructed to produce stressed default rates. Such matrices are often used for credit risk measurement.

Comparing transition rates with default rates

Rating transition rates may be compared with the marginal and cumulative default rates described in the previous section. For example, the one-year default rate column of table 4 is equivalent to column 'D' of the average one-year transition matrix in table 5. Average cumulative default rates are the summary of all static pools from 1998-2022, while the number of pools used in the average transition rate is limited by the transition's time horizon.

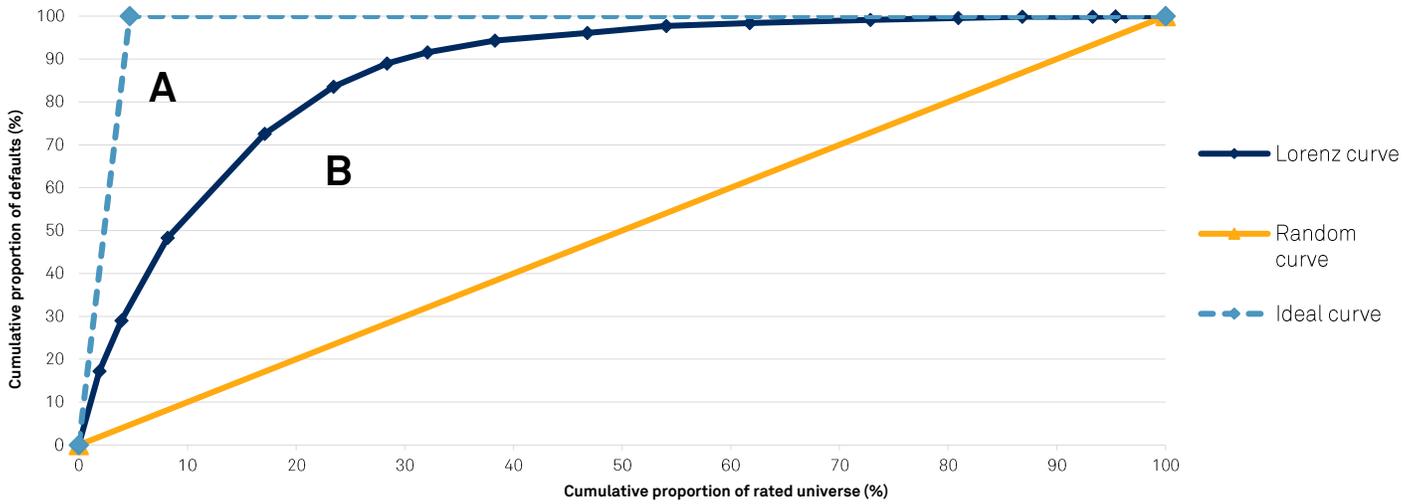
Appendix II: Gini Methodology

To measure relative rating performance, we use the Lorenz curve as a graphical representation of the proportionality of a distribution, and we summarize this via the Gini coefficient. For this study, the Lorenz curve is plotted with the x-axis showing the cumulative share of issuers, arranged by rating, while the y-axis represents the cumulative share of defaulters, also arranged by rating. For both axes of the Lorenz curve, the observations are ordered from the low end of the rating scale ('twCCC'/'twC') to the high end ('twAAA').

As an example, if 'twCCC'/'twC' rated entities made up 10% of the total population of issuers at the start of the time frame examined (x-axis) and 50% of the defaulters (y-axis), then the coordinate (10, 50) would be the first point on the curve. If TRC's corporate ratings only randomly approximated default risk, the Lorenz curve would fall along the diagonal. The Gini coefficient--which is a summary statistic of the Lorenz curve--would thus be zero. If corporate ratings were perfectly rank ordered so that all defaults occurred only among the lowest-rated entities, the curve would capture all of the area above the diagonal on the graph (the ideal curve), and its Gini coefficient would be 1 (see chart 6).

The procedure for calculating the Gini coefficients is illustrated in chart 6: Area B is bounded by the random curve and the Lorenz curve, while area A is bounded by the Lorenz curve and the ideal curve. The Gini coefficient is defined as area B divided by the total of area A plus area B. In other words, the Gini coefficient captures the extent to which actual rating accuracy diverges from the random scenario and approaches the ideal scenario.

Chart 6
Sample Lorenz Curve



Source: S&P Global Ratings Research

The use of the term "methodology" in this article refers to data aggregation and calculation methods used in conducting the research. It does not relate to S&P Global Ratings' methodologies, which are publicly available criteria used to determine credit ratings.

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