

Default, Transition, and Recovery:

2020 Annual Taiwan Ratings Corp. Corporate Default And Rating Transition Study

June 3, 2021

Key Takeaways

- The stability of Taiwan Ratings Corp.'s corporate ratings--as measured by the percentage of issuers with the same ratings at the end of the year as at the beginning--fell to 87.3% in 2020 from 88.4% in 2019, with a 22-year weighted average of 78.1%.
- The percentage of upgrades among total rating actions fell to 2% from 4.1%, and downgrades rose to 6.7% from 3.4%. There were no defaults for the fourth straight year.
- Taiwan Ratings Corp.'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.

Among corporate entities (including financial services and insurance companies) rated by Taiwan Ratings Corp. (TRC), the upgrade ratio (the proportion of upgrades among total rating actions) again fell by more than half in 2020, to 2% from 2019's 4.1%, while downgrades almost doubled to 6.7% from 3.4%. Ratings stability (as measured by the proportion of ratings that remained the same from the start of the year to the end of the year) fell to 87.3% from 88.4% but remained higher than the historical weighted average of 78.1%.

This default and rating transition study closely examines the history of the 320 corporate issuer credit ratings that TRC has assigned since its operations began in 1998. We primarily measure ratings migration over time and provide quantitative measures of ratings 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 These include publicly and confidentially rated entities, as well as those with ratings that were later withdrawn.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- and short-term sovereign credit ratings on Taiwan to 'AA/A-1+' with a positive outlook in April 2021.) Because of the differences in the two ratings scales, we do not make any direct comparisons between S&P Global Ratings' and TRC's ratings in this report. However, generally, both ratings scales display the same principle: Higher ratings exhibit lower default rates and greater stability than lower ratings.

The Taiwanese economy grew 3.1% in 2020, and S&P Global economists currently predict 4.2% growth in 2021, followed by 2.7% in 2022 (see "Economic Outlook Asia-Pacific Q2 2021: Three-Speed Recovery Will Benefit From Faster Global Growth").

RATINGS PERFORMANCE ANALYTICS

Nick W Kraemer, FRM
New York
+1-212-438-1698
nick.kraemer
@spglobal.com

Zev R Gurwitz
New York
+1-212-438-7128
zev.gurwitz
@spglobal.com

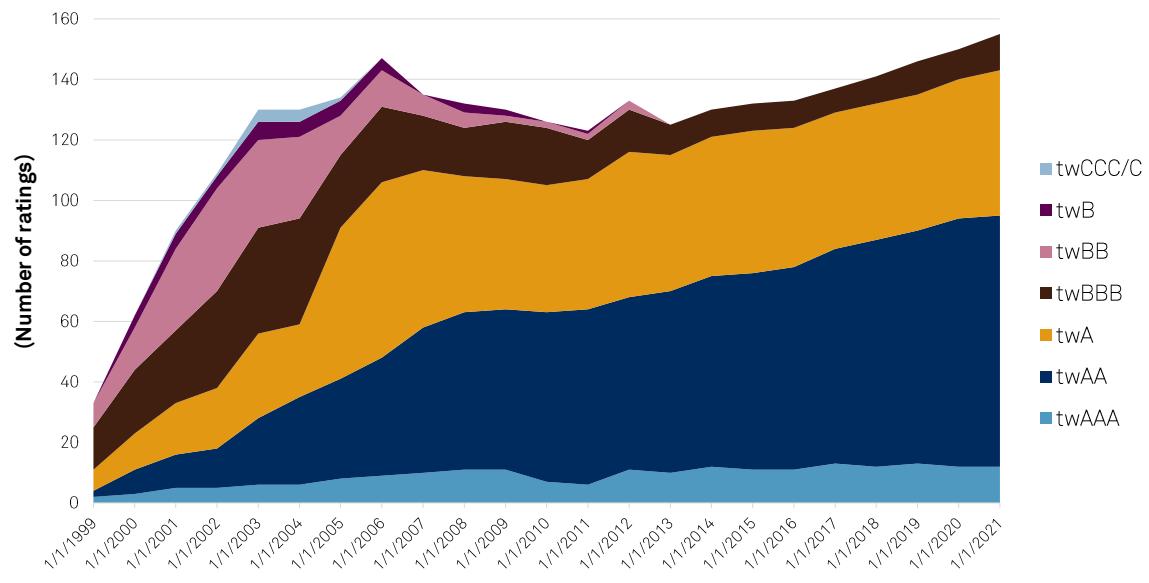
ADDITIONAL CONTACT

Irene Lai
Taipei
+886-2-2175-6825
irene.lai
@taiwanratings.com.tw
irene.lai
@spglobal.com

The number of TRC ratings tracked in this study has been small but meaningful over time, starting at 33 active ratings in 1999 and increasing to 156 by the start of 2021. Historically, TRC corporate ratings have been heavily skewed toward investment-grade ('twBBB-' or higher), and this trend has only been increasing (see chart 1). In fact, for the ninth year in a row, at the start of 2021 all TRC corporate ratings were investment-grade. Speculative-grade ('twBB+' or lower) TRC ratings have been steadily decreasing as a portion of total ratings since they peaked at 36% at the start of 2001.

Chart 1

Taiwan National Scale Corporate Rating Distribution



Data are as of Jan. 1. Source: S&P Global Fixed Income Research. Copyright © by Taiwan Ratings Corp. All rights reserved.

Ratings Trended Downward In 2020

To analyze rating actions during the year, we look at the ratings at the start of the year and at the end of the year. During 2020, there were three upgrades (down from six) and 10 downgrades (up from five), with no defaults (see table 1). This was the fourth year in a row with no defaults among TRC ratings.

The ratio of downgrades to upgrades was therefore 3.3 to 1, much higher than the historical average of 0.5 to 1. This higher percentage of downgrades is broadly consistent with the experience of S&P Global Ratings' global long-term issuer credit ratings in 2020.

Table 1

Summary Of Annual Ratings Changes In Taiwan (1999-2020)

Year	Issuer count as of Jan. 1	Upgrades (%)	Dowgrades (%)*	Defaults (%)	Withdrawn ratings (%)	Unchanged ratings (%)	Changed ratings (%)	Downgrade/upgrade ratio
01/01/1999	33	9.1	0	0	0	90.9	9.1	0
01/01/2000	62	3.2	12.9	1.6	3.2	79	21	4
01/01/2001	90	2.2	11.1	0	3.3	83.3	16.7	5
01/01/2002	109	16.5	18.4	0	13.8	51.4	48.6	1.1
01/01/2003	130	15.4	3.9	0	13.9	66.9	33.1	0.3
01/01/2004	130	57.7	2.3	0	9.2	30.8	69.2	0
01/01/2005	134	14.2	0.8	0.8	5.2	79.1	20.9	0.1
01/01/2006	147	15.7	2.7	0.7	17	64	36.1	0.2
01/01/2007	135	17.8	4.4	3.7	6.7	67.4	32.6	0.2
01/01/2008	132	4.6	4.6	1.5	5.3	84.1	15.9	1
01/01/2009	130	0.8	17.7	0	9.2	72.3	27.7	23
01/01/2010	126	4.8	3.2	0	7.1	84.9	15.1	0.7
01/01/2011	123	12.2	5.7	0	2.4	79.7	20.3	0.5
01/01/2012	133	3	3	0	11.3	82.7	17.3	1
01/01/2013	125	6.4	3.2	0	4	86.4	13.6	0.5
01/01/2014	130	3.1	1.5	0	3.9	91.5	8.5	0.5
01/01/2015	132	6.1	3	0	3	87.9	12.1	0.5
01/01/2016	133	6	2.3	0.8	1.5	89.5	10.5	0.4
01/01/2017	137	6.6	0	0	3.7	89.8	10.2	0
01/01/2018	141	10.6	0	0	3.6	85.8	14.2	0
01/01/2019	146	4.1	3.4	0	4.1	88.4	11.6	0.8
01/01/2020	150	2	6.7	0	4	87.3	12.7	3.3
Weighted average (1999-2020)		10.3	4.8	0.4	6.5	78.1	21.9	0.5

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

All three upgrades were of financial institutions, and all but two of the dowgrades were of nonfinancial corporate issuers. Five of the dowgrades among nonfinancial companies were related to the Formosa Plastics Group, which was downgraded in October due to "growing operating headwinds," including weak demand in the coming years.

Two of the three upgrades in 2020 were to the 'twAA' category from the 'twA' category (see table 2), while two dowgrades were to the 'twA' category from the 'twAA' category and one was to the 'twBBB' category from the 'twA' category.

Table 2

1 Year Most Recent Transitions

Taiwan Ratings Corp.'s issuer ratings (2020-2020)

(Number of ratings)	Total	twAAA	twAA+	twAA	twAA-	twA+	twA	twA-	twBBB+	twBBB	twBBB-	twBB+	twBB-	twB+	twB	twB-	twCCC/C	D	NR
twAAA	12	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
twAA+	26	0	24	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twAA	22	0	0	18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twAA-	34	0	0	0	32	1	0	0	0	0	0	0	0	0	0	0	0	0	1
twA+	22	0	0	1	1	18	2	0	0	0	0	0	0	0	0	0	0	0	0
twA	12	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	1
twA-	12	0	0	0	0	0	0	11	1	0	0	0	0	0	0	0	0	0	0
twBBB+	5	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
twBBB	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
twBBB-	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
twBB+	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
twBB-	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
twB	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
twCCC/C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NR--Not rated. Data as of Jan. 1, 2021. Source: S&P Global Ratings Research.

Table 3

New Issuer Sector Breakdown

(Number of issuers)	Financial institutions	Industrials and utilities	Total
01/01/1998	31	2	33
01/01/1999	24	5	29
01/01/2000	26	5	31
01/01/2001	8	14	22
01/01/2002	28	9	37
01/01/2003	8	8	16
01/01/2004	6	9	15
01/01/2005	10	9	19
01/01/2006	7	8	15
01/01/2007	10	3	13
01/01/2008	7	2	9
01/01/2009	2	3	5
01/01/2010	1	5	6
01/01/2011	4	4	8

01/01/2012	3	2	5
01/01/2013	7	1	8
01/01/2014	1	5	6
01/01/2015	2	3	5
01/01/2016	3	1	4
01/01/2017	1	7	8
01/01/2018	1	6	7
01/01/2019	4	6	10
01/01/2020	3	6	9
Total	197	123	320
% of total	61.6	38.4	100

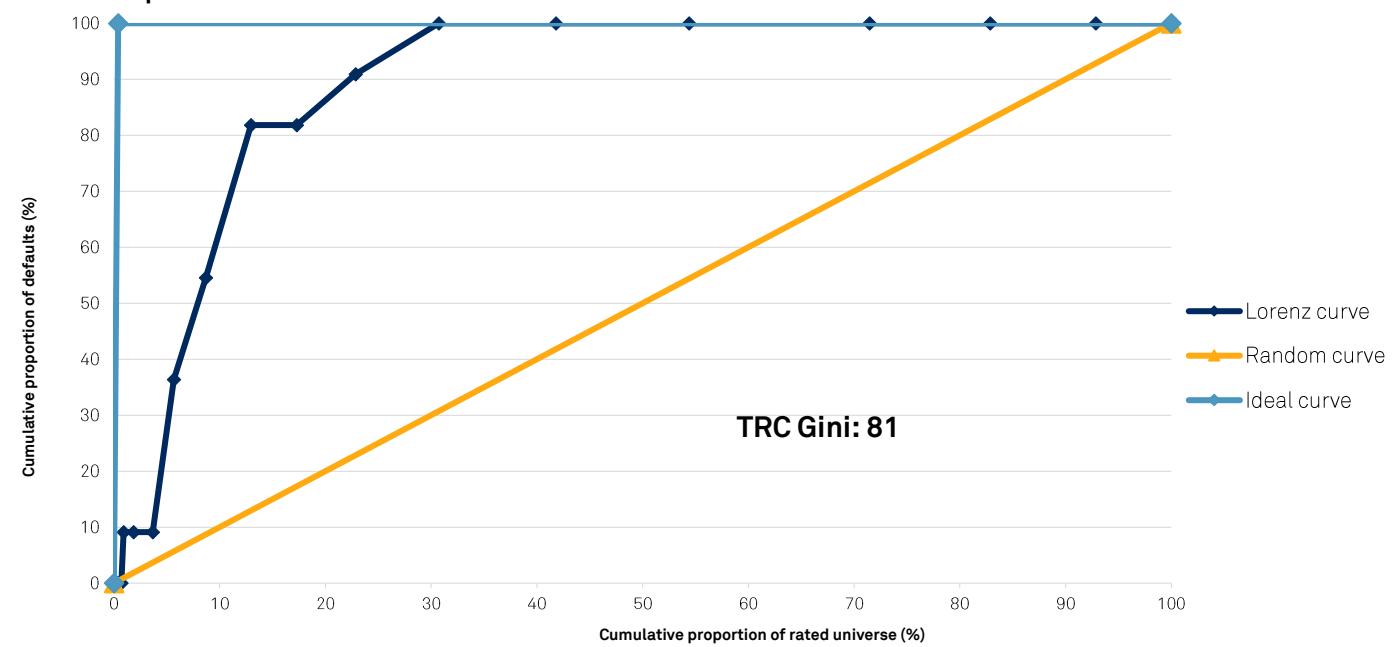
Source: S&P Global Fixed Income Research.

Lorenz Curves And Gini Coefficients

Gini ratios 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 time span, lower ratings correspond to higher default rates (see charts 2-4). For example, in the one-year Lorenz curve, 55% of defaults occurred in the speculative-grade category, while speculative-grade ratings constituted only 8.7% 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 ratio of zero (see "Appendix 2: Gini Methodology").

Chart 2

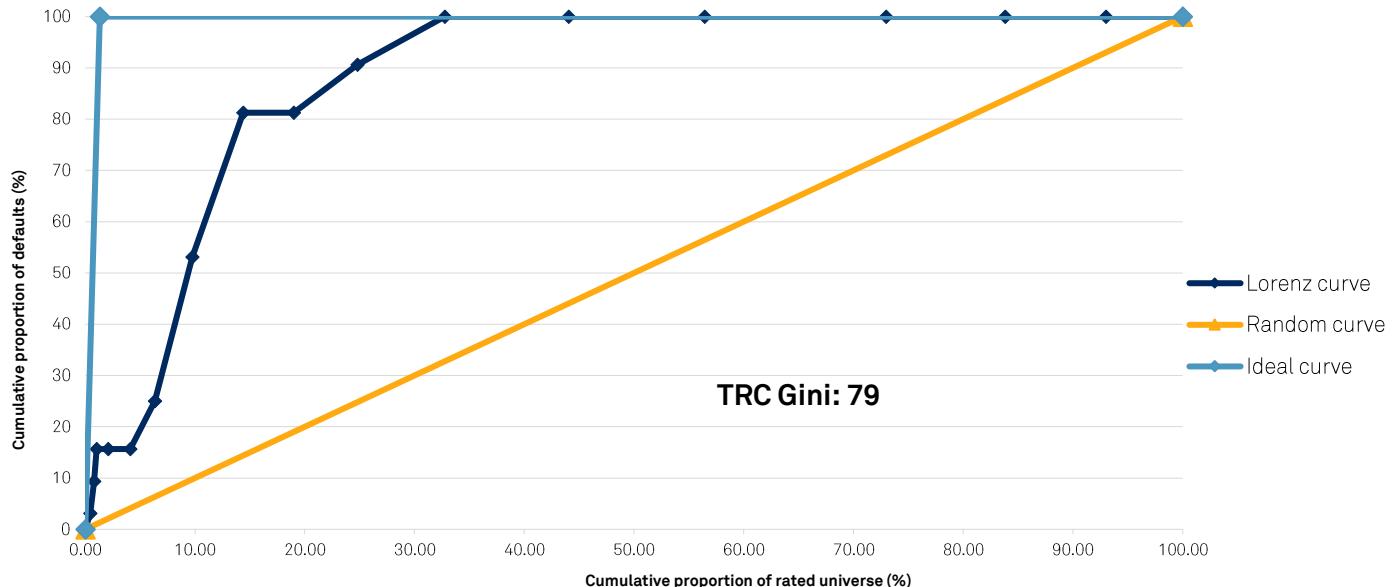
Taiwan Corporate One-Year Lorenz Curve And Gini Coefficient



Source: S&P Global Ratings Research.

Chart 3

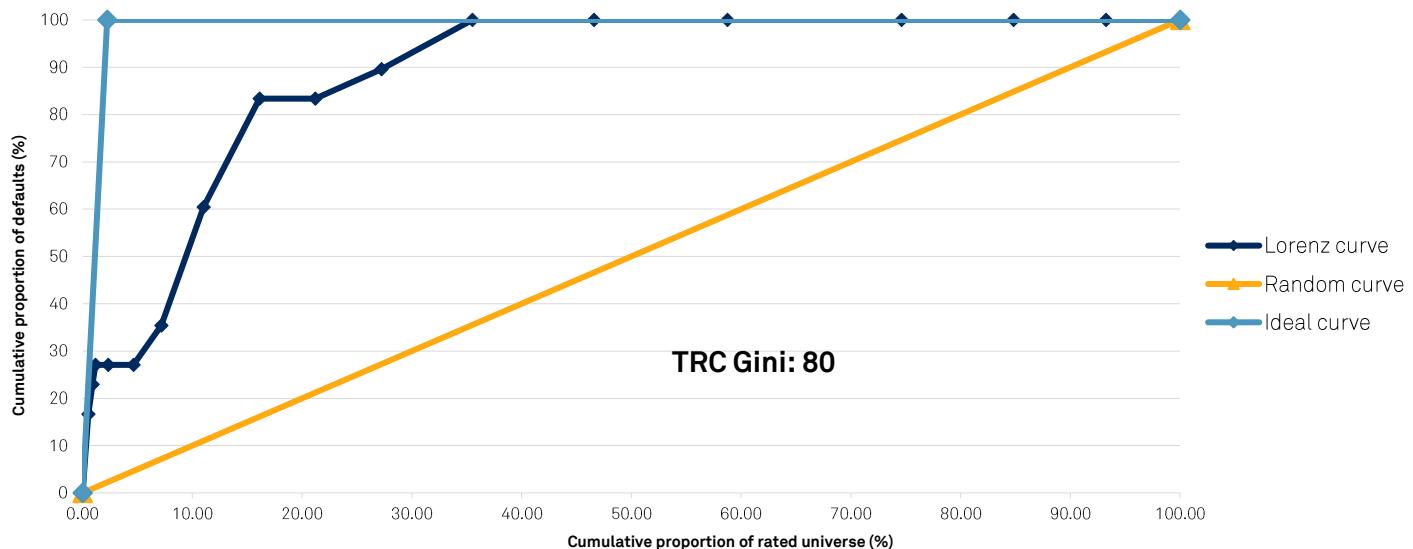
Taiwan Corporate Three-Year Lorenz Curve And Gini Coefficient



Source: S&P Global Ratings Research.

Chart 4

Taiwan Corporate Five-Year Lorenz Curve And Gini Coefficient



Source: S&P Global Ratings Research.

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 Research's 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 dataset, for which there is no default activity until the three-year horizon. However, by year four, this category's default rate is well above the 'twB' category's--in line with expectations.

Table 4

Taiwan Cumulative Average Default Rates 1999-2020

(%)	--Time horizon (years)--									
	1	2	3	4	5	6	7	8	9	10
twAAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
twAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
twA	0.12	0.24	0.37	0.51	0.66	0.82	0.99	0.99	0.99	0.99
twBBB	1.04	2.38	3.21	3.77	3.77	4.07	4.68	5.30	5.95	5.95
twBB	2.70	4.86	6.49	7.03	8.65	10.27	11.89	12.97	13.51	13.51
twB	2.56	7.69	10.26	10.26	12.82	15.38	20.51	25.64	28.21	28.21
twCCC/C	0.00	0.00	9.09	45.45	72.73	90.91	100.00	N/A	N/A	N/A
Investment grade	0.20	0.46	0.64	0.79	0.84	0.96	1.14	1.28	1.42	1.42
Speculative grade	2.55	5.11	7.23	9.36	12.34	14.89	17.45	19.15	20.00	20.00
All rated	0.41	0.88	1.25	1.60	1.98	2.38	2.86	3.21	3.46	3.46

N/A--Not applicable. Data as of Jan. 1, 2021. Source: S&P Global Ratings Research.

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 Research default studies in that there is a clear correspondence between higher ratings and lower default activity.

Ratings stability is also generally higher among investment-grade ratings than speculative-grade ratings. For example, over a one-year time frame, an average of 96% of 'twAA' rated issuers maintain this rating, higher than 59.5% of 'twBB' rated issuers that maintain 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 (1999-2020)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	89.18	5.67	0.00	0.00	0.00	0.00	0.00	0.00	5.15
	(15.51)	(14.17)	0.00	0.00	0.00	0.00	0.00	0.00	(6.65)
twAA	1.25	95.77	0.86	0.00	0.00	0.00	0.00	0.00	2.11
	(2.19)	(4.01)	(1.57)	0.00	0.00	0.00	0.00	0.00	(2.31)
twA	0.00	5.85	88.42	1.75	0.12	0.00	0.00	0.12	3.74
	0.00	(6.75)	(7.74)	(3.15)	(0.52)	0.00	0.00	(0.55)	(4.17)
twBBB	0.00	0.26	8.57	75.06	1.30	0.00	0.00	1.04	13.77
	0.00	(1.10)	(21.06)	(22.91)	(2.08)	0.00	0.00	(3.25)	(12.03)
twBB	0.00	0.00	0.54	12.43	59.46	0.54	0.54	2.70	23.78
	0.00	0.00	(1.36)	(17.32)	(27.35)	(2.83)	(1.18)	(6.81)	(17.17)
twB	0.00	0.00	0.00	0.00	7.69	46.15	7.69	2.56	35.90
	0.00	0.00	0.00	0.00	(9.78)	(31.77)	(17.04)	(9.36)	(35.84)
twCCC/CC	0.00	0.00	0.00	0.00	36.36	0.00	63.64	0.00	0.00
	0.00	0.00	0.00	0.00	(45.17)	0.00	(45.17)	0.00	0.00

NR--Not rated. Data as of Jan. 1, 2021. Source: S&P Global Ratings Research.

Table 6

Average Three-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2020)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	73.96	14.79	0.00	0.00	0.00	0.00	0.00	0.00	11.24
	(23.35)	(23.45)	0.00	0.00	0.00	0.00	0.00	0.00	(10.16)
twAA	3.17	89.12	1.81	0.00	0.00	0.00	0.00	0.00	5.90
	(4.12)	(5.32)	(1.87)	0.00	0.00	0.00	0.00	0.00	(2.33)
twA	0.00	14.81	70.64	3.67	0.52	0.00	0.00	0.39	9.96
	0.00	(11.54)	(11.59)	(4.97)	(1.35)	0.00	0.00	(0.87)	(5.33)
twBBB	0.00	2.75	18.73	44.63	1.93	0.00	0.00	3.31	28.65
	0.00	(3.81)	(26.30)	(26.45)	(3.86)	0.00	0.00	(5.47)	(14.85)
twBB	0.00	0.00	5.41	23.78	18.38	0.00	1.08	6.49	44.86
	0.00	0.00	(7.91)	(14.11)	(20.97)	0.00	(2.25)	(13.80)	(16.86)
twB	0.00	0.00	2.56	2.56	5.13	2.56	15.38	10.26	61.54
	0.00	0.00	(6.34)	(7.99)	(9.95)	(6.34)	(26.02)	(12.40)	(35.06)
twCCC/CC	0.00	0.00	0.00	0.00	72.73	9.09	9.09	9.09	0.00
	0.00	0.00	0.00	0.00	(40.34)	(32.14)	(32.14)	(13.45)	0.00

NR--Not rated. Data as of Jan. 1, 2021. Source: S&P Global Ratings Research.

Table 7

Average Five-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2020)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	65.97	21.53	0.00	0.00	0.00	0.00	0.00	0.00	12.50
	(22.24)	(22.40)	0.00	0.00	0.00	0.00	0.00	0.00	(9.23)
twAA	4.21	84.65	2.04	0.00	0.00	0.00	0.00	0.00	9.10
	(5.51)	(5.81)	(1.39)	0.00	0.00	0.00	0.00	0.00	(2.28)
twA	0.00	20.65	58.84	3.27	0.45	0.00	0.00	0.74	16.05
	0.00	(13.44)	(14.20)	(3.73)	(1.05)	0.00	0.00	(1.03)	(7.77)
twBBB	0.00	6.65	23.41	28.90	0.29	0.00	0.00	4.05	36.71
	0.00	(6.55)	(27.21)	(19.93)	(1.47)	0.00	0.00	(5.44)	(17.27)
twBB	0.00	1.08	7.57	20.00	3.78	0.00	0.00	8.65	58.92
	0.00	(1.62)	(7.77)	(12.62)	(4.08)	0.00	0.00	(13.11)	(15.62)
twB	0.00	0.00	2.56	0.00	12.82	0.00	2.56	12.82	69.23
	0.00	0.00	(7.05)	0.00	(20.04)	0.00	(7.99)	(12.62)	(32.94)
twCCC/CC	0.00	0.00	0.00	0.00	18.18	9.09	0.00	72.73	0.00
	0.00	0.00	0.00	0.00	(43.12)	(13.45)	0.00	(40.34)	0.00

NR--Not rated. Data as of Jan. 1, 2021. Source: S&P Global Ratings Research.

Table 8

Average 10-Year Transition Rates (%)

Taiwan Ratings Corp.'s issuer ratings (1999-2020)

From/to	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	48.31	39.33	0.00	0.00	0.00	0.00	0.00	0.00	12.36
	(23.34)	(15.96)	0.00	0.00	0.00	0.00	0.00	0.00	(10.45)
twAA	5.19	78.07	2.59	0.00	0.00	0.00	0.00	0.00	14.15
	(3.65)	(3.79)	(1.90)	0.00	0.00	0.00	0.00	0.00	(3.31)
twA	0.00	28.12	39.91	2.95	0.00	0.00	0.00	1.13	27.89
	0.00	(9.71)	(9.74)	(2.34)	0.00	0.00	0.00	(1.07)	(9.10)
twBBB	1.02	12.54	18.98	16.95	0.00	0.00	0.00	6.10	44.41
	(1.46)	(7.33)	(17.55)	(9.58)	0.00	0.00	0.00	(6.71)	(17.51)
twBB	0.00	2.20	3.30	6.04	0.00	0.00	0.00	13.74	74.73
	0.00	(2.46)	(3.56)	(5.38)	0.00	0.00	0.00	(11.63)	(7.67)
twB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.21	71.79
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(31.11)	(31.11)
twCCC/CC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NR--Not rated. Data as of Jan. 1, 2021. 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 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 320 companies to which TRC had assigned ratings as of Dec. 31, 1998, or that were first rated between that date and Dec. 31, 2020. These include industrials, utilities, insurance companies, financial holding companies, banks, securities firms, and other financial services 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 manner. 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 take 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 2001-2020.

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 (NR) in 2002 and a default ('D') 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 22 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 accumulating the average conditional marginal default rates. Conditional default rates are calculated by dividing the number of issuers in a static pool that default at 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 22 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 also increase 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, 2020, had 22 one-year transitions, while companies first rated between Jan. 1, 2020, and Dec. 31, 2020, 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 ratings 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. In addition, multiyear transition matrices are valuable tools that can be used to forecast rating distributions and may be better suited for certain applications than one-year transition matrices.

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 1998-2020, while the number of pools used in the average transition rate is limited by the transition's time horizon.

Appendix 2: Gini Methodology

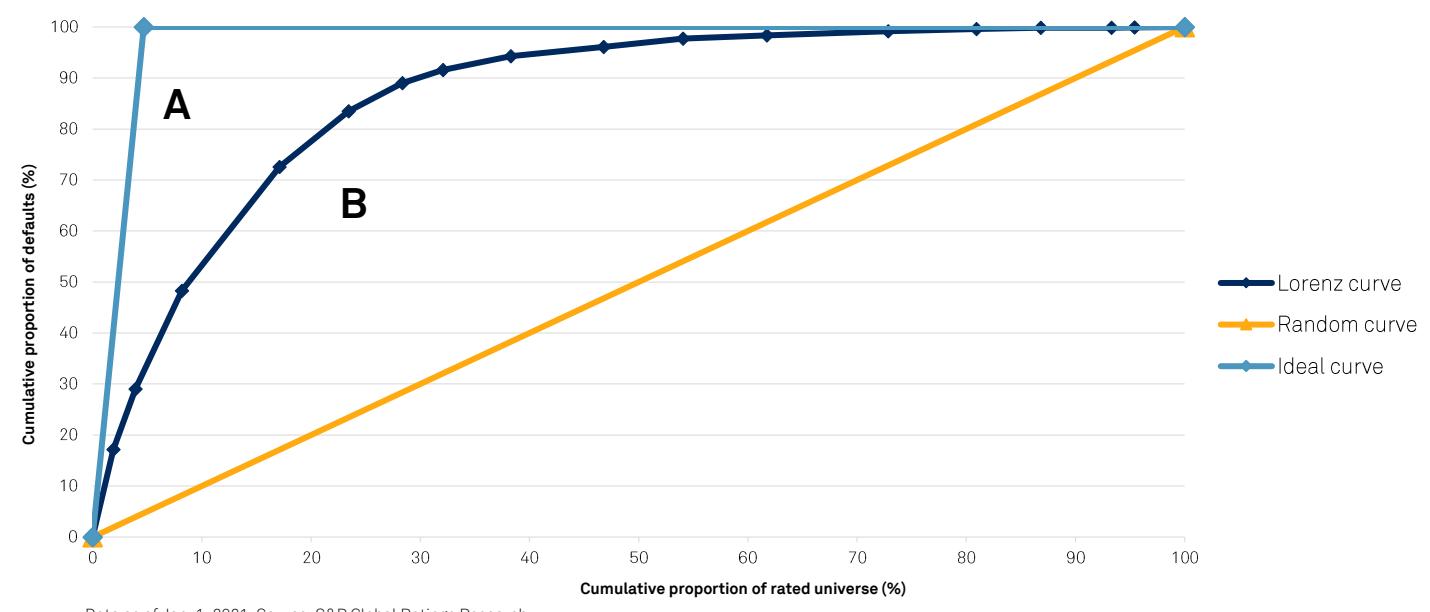
To measure relative ratings performance, we utilize the Lorenz curve as a graphical representation of the proportionality of a distribution, and we summarize this via the Gini coefficient. For this study, the Lorenz curve is plotted with the x-axis showing the cumulative share of issuers, arranged by 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 ratings 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 5).

The procedure for calculating the Gini coefficients is illustrated in chart 5: 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 ratings accuracy diverges from the random scenario and aspires to the ideal scenario.

Chart 5

Sample Lorenz Curve



Related Research

- Research Update: Taiwan Ratings Raised To 'AA/A-1+' With Positive Outlook On Strong And Sustained Growth, April 22, 2021
- 2020 Annual Global Corporate Default And Rating Transition Study, www.capitaliq.com, April 7, 2020
- Economic Outlook Asia-Pacific Q2 2021: Three-Speed Recovery Will Benefit From Faster Global Growth, www.capitaliq.com, March 24, 2021
- Research Update: Ratings On Formosa Plastics Group Lowered To 'BBB+' On Growing Operating Headwinds; Outlook Stable, Oct. 16, 2020

This report does not constitute a rating action.

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.

Copyright © 2021 by Taiwan Ratings Corporation (TRC). All rights reserved.

No content (including ratings, credit-related analyses and data, valuations, model, software or other application or output therefrom) or any part thereof (Content) may be modified, reverse engineered, reproduced or distributed in any form by any means, or stored in a database or retrieval system, without the prior written permission of TRC. The Content shall not be used for any unlawful or unauthorized purposes. TRC and any third-party providers, as well as their directors, officers, shareholders, employees or agents (collectively TRC Parties) do not guarantee the accuracy, completeness, timeliness or availability of the Content. TRC Parties are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, for the results obtained from the use of the Content, or for the security or maintenance of any data input by the user. The Content is provided on an "as is" basis. TRC DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall TRC be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs or losses caused by negligence) in connection with any use of the Content even if advised of the possibility of such damages.

Credit-related and other analyses, including ratings, and statements in the Content are statements of opinion as of the date they are expressed and not statements of fact. TRC's opinions, analyses and rating acknowledgment decisions (described below) are not recommendations to purchase, hold, or sell any securities or to make any investment decisions, and do not address the suitability of any security. TRC assumes no obligation to update the Content following publication in any form or format. The Content should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. TRC does not act as a fiduciary or an investment advisor except where registered as such. While TRC has obtained information from sources it believes to be reliable, TRC does not perform an audit and undertakes no duty of due diligence or independent verification of any information it receives. Rating-related publications may be published for a variety of reasons that are not necessarily dependent on action by rating committees, including, but not limited to, the publication of a periodic update on a credit rating and related analyses.

To the extent that regulatory authorities allow a rating agency to acknowledge in one jurisdiction a rating issued in another jurisdiction for certain regulatory purposes, TRC reserves the right to assign, withdraw or suspend such acknowledgement at any time and in its sole discretion. TRC disclaims any duty whatsoever arising out of the assignment, withdrawal or suspension of an acknowledgment as well as any liability for any damage alleged to have been suffered on account thereof.

TRC keeps certain activities of its business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain business units of TRC may have information that is not available to other TRC business units. TRC has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

TRC receives compensation for its solicited ratings and certain analyses, normally from issuers, originators, arrangers, or underwriters of securities or from obligors. TRC reserves the right to disseminate its opinions and analyses. TRC's public ratings and analyses are made available on its Web sites, www.taiwanratings.com (free of charge), and trs.taiwanratings.com.tw (subscription), and may be distributed through other means, including via TRC publications and third-party redistributors. Please click [here](#) for any other conflict of interests that may affect the credit rating as requested by the regulator.