



# Default, Transition, and Recovery: 2016 Annual Taiwan Ratings Corp. Corporate Default Study And Rating Transitions

中華信用評等  
*Taiwan Ratings*  
An S&P Global Ratings Partner

Celebrating  
20 Years of Excellence

May 31, 2017

# **Default, Transition, and Recovery: 2016 Annual Taiwan Ratings Corp. Corporate Default Study And Rating Transitions**



## **Global Fixed Income Research**

Diane Vazza,  
Managing Director,  
New York (1) 212-438-2760;  
diane.vazza@spglobal.com

Nick W Kraemer, FRM,  
Senior Director,  
New York (1) 212-438-1698;  
nick.kraemer@spglobal.com

Zev R Gurwitz,  
Associate,  
New York (1) 212-438-7128;  
zev.gurwitz@spglobal.com

## **Additional Contact**

Jin Dong, CFA,  
Associate  
Taipei (8862) 8722-5821;  
jin.dong@taiwanratings.com.tw

## **Table Of Contents**

Rating Actions Were Muted In 2016

Lorenz Curves And Gini Coefficients

Ratings And Cumulative Default Rates  
Remained Negatively Correlated

Transition Matrices

Appendix I: Default Methodology And  
Definitions

Appendix II: Gini Methodology

Related Research

For corporate entities and financial services companies rated by Taiwan Ratings Corp. (TRC), ratings remained relatively stable in 2016. 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) was 88.7%, compared with a historical weighted average of 75.4%. There was one default in 2016 (Solar Applied Materials Technology Corp.), the first since 2008.

This default and rating transitions study closely examines the track record of the 282 corporate issuer credit ratings that TRC has assigned since operations began in 1998. This study primarily measures ratings migration over time and provides a quantitative measure 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. This includes public and confidentially rated entities, as well as those whose ratings we later withdrew. The negative relationship between higher ratings and both ratings volatility and default frequency is consistent with other S&P Global Fixed Income Research default studies.

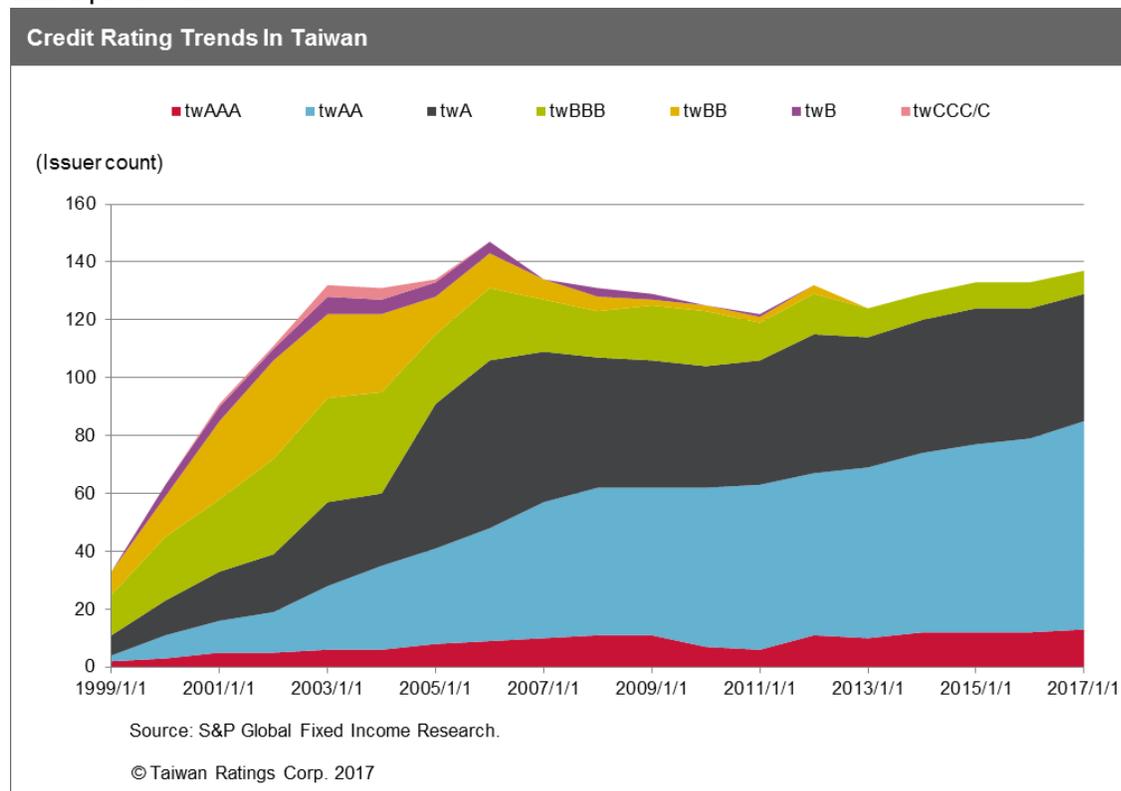
#### **Overview:**

- Ratings stability--as measured by the percentage of issuers with the same ratings at the end of the year as at the beginning--rose slightly to 88.7% from 86.5%.
- Solar Applied Materials Technology Corp. was the only default in 2016--the first since 2008.
- Taiwan Ratings Corp.'s ratings show a clear correspondence between rating and default remoteness, with default rates among investment-grade ratings well below those of speculative-grade ratings across all time frames. This finding is also consistent with S&P Global Ratings' global scale ratings.

The default risk for S&P Global Ratings' global scale ratings and ratings on TRC's scale, which is a national scale, differs. National scale credit ratings are calibrated to provide greater distinction of the relative credit risk within a country. (S&P Global Ratings has assigned the government of Taiwan 'AA-/A-1+' unsolicited issuer credit ratings, with a stable outlook.) 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, as a general rule, both ratings scales display the same principles: Higher ratings exhibit lower default rates and greater stability than lower ratings.

The number of Taiwan corporate and financial services companies (including insurance companies) ratings has been small, but meaningful, starting in 1999 with 33 active ratings and increasing to 137 by the start of 2017. Historically, Taiwan corporate ratings have been heavily skewed toward investment grade, and this trend has only been increasing over time (see chart 1). In fact, for the fourth year in a row, all Taiwan corporate and financial services ratings were investment grade at the start of 2016. Speculative-grade ratings in Taiwan have been steadily decreasing as a portion of the population since they peaked at 36% at the end of 2000.

Chart 1 | [Download](#)



### Rating Actions Were Muted In 2016

To analyze rating actions during the year, we look at the rating at the start of the year and at the end of the year. During 2016, there were eight upgrades and five downgrades (see table 1). One of the downgrades, Solar Applied Materials Technology Corp., defaulted in 2016 after the rating was withdrawn at the issuers request earlier in the year. Ratings stability rose slightly to 88.7%, from 86.5% in 2015. In general, higher ratings tend to be more stable than lower ratings, and the Taiwan population has been exclusively investment grade for four straight years. In 2016, the percentage of changed ratings was 11.3%, down from 13.5% in 2015 and well below the long-term average of 24.6%.

Table 1 | [Download](#)

1 Year Most Recent Transitions																				
Taiwan Ratings Corp.'s Issuer Ratings (2016-2016)																				
From/To	Total	twAAA	twAA+	twAA	twAA-	twA+	twA	twA-	twBBB+	twBBB	twBBB-	twBB+	twBB	twBB-	twB+	twB	twB-	twCCC	D	NR
twAAA	12	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twAA+	18	1	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twAA	20	0	2	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
twAA-	29	0	0	1	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twA+	22	0	0	0	3	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0
twA	17	0	0	1	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0
twA-	6	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
twBBB+	7	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	1
twBBB	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
twBBB-	1	0	0	0	0	0	0	0	0	0	1	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
twBB	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
twB+	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
twB-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
twCCC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: S&P Global Fixed Income Research. © Taiwan Ratings Corp. 2017

In 2016, 6% of ratings were raised, 3% were lowered, and 1.5% were withdrawn. Also during the year, four entities in Taiwan were assigned new ratings (see table 2).

**Table 2 | [Download](#)**

Summary Of Annual Ratings Changes In Taiwan (1999-2016)								
Year	Issuers as of Jan. 1	Upgrades (%)	Downgrades (%)*	Defaults (%)	Withdrawn ratings (%)	Changed ratings (%)	Unchanged ratings (%)	Downgrade/upgrade ratio
1999	33	9.09	0.00	0.00	0.00	9.09	90.91	0.00
2000	63	3.17	12.70	1.59	3.17	20.63	79.37	4.00
2001	91	2.20	10.99	0.00	3.30	16.48	83.52	5.00
2002	111	17.12	18.02	0.00	12.61	47.75	52.25	1.05
2003	132	15.15	3.79	0.00	13.64	32.58	67.42	0.25
2004	131	57.25	2.29	0.00	9.16	68.70	31.30	0.04
2005	134	13.43	0.75	0.75	5.22	20.15	79.85	0.06
2006	147	15.65	2.72	0.68	17.01	36.05	63.95	0.17
2007	134	17.91	4.48	3.73	6.72	32.84	67.16	0.25
2008	131	4.58	5.34	1.53	5.34	16.79	83.21	1.17
2009	129	0.78	16.28	0.00	9.30	26.36	73.64	21.00
2010	125	4.80	3.20	0.00	7.20	15.20	84.80	0.67
2011	122	12.30	5.74	0.00	2.46	20.49	79.51	0.47
2012	132	3.03	3.03	0.00	11.36	17.42	82.58	1.00
2013	124	6.45	3.23	0.00	4.03	13.71	86.29	0.50
2014	129	3.10	1.55	0.00	3.88	8.53	91.47	0.50
2015	133	6.02	3.76	0.00	3.76	13.53	86.47	0.63
2016	133	6.02	3.01	0.75	1.50	11.28	88.72	0.50
Weighted average (1999-2016)		11.53	5.39	0.52	7.17	24.60	75.40	0.47

\*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 Fixed Income Research. © Taiwan Ratings Corp. 2017

Of the eight upgrades in 2016, four are companies under the umbrella of **Hua Nan Financial Holdings Co. Ltd.** and were upgraded because we believe that the company will "maintain strong capitalization and adopt a more conservative business expansion plan" that takes into account the "lukewarm economic prospects of Taiwan and China" over the next two years. The other four upgrades in 2016 were all subsidiaries of companies that had their global scale ratings raised. All eight upgrades were among financial services companies--one insurance entity and the rest financial institutions.

The four downgrades in 2016 were evenly divided between corporate and financial issuers, and the one default was Solar Applied Materials Technology Corp., which defaulted in 2016 after requesting that the rating be withdrawn earlier in the year. The default followed the company's confession of accounting fraud by the chairman and several members of senior management in May.

**Table 3 | [Download](#)**

<b>New Issuer Sector Breakdown</b>			
	<b>Financial institutions</b>	<b>Industrials and utilities</b>	<b>Total</b>
1998	31	2	33
1999	25	5	30
2000	26	5	31
2001	9	14	23
2002	28	11	39
2003	8	8	16
2004	6	9	15
2005	9	10	19
2006	6	8	14
2007	9	4	13
2008	7	2	9
2009	2	3	5
2010	1	5	6
2011	4	4	8
2012	3	2	5
2013	6	2	8
2014	3	5	8
2015	2	3	5
2016	3	1	4
<b>Total</b>	<b>188</b>	<b>103</b>	<b>291</b>
% of total	64.6	35.4	100.0

Source: S&P Global Fixed Income Research. © Taiwan Ratings Corp. 2017

### **Lorenz Curves And Gini Coefficients**

Gini ratios are a measure of 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, 60% of defaults occurred in the speculative-grade category ('twBB+' or lower), while ratings of 'twBB+' or lower constituted only 12% 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: II Gini Methodology).

Chart 2 | [Download](#)

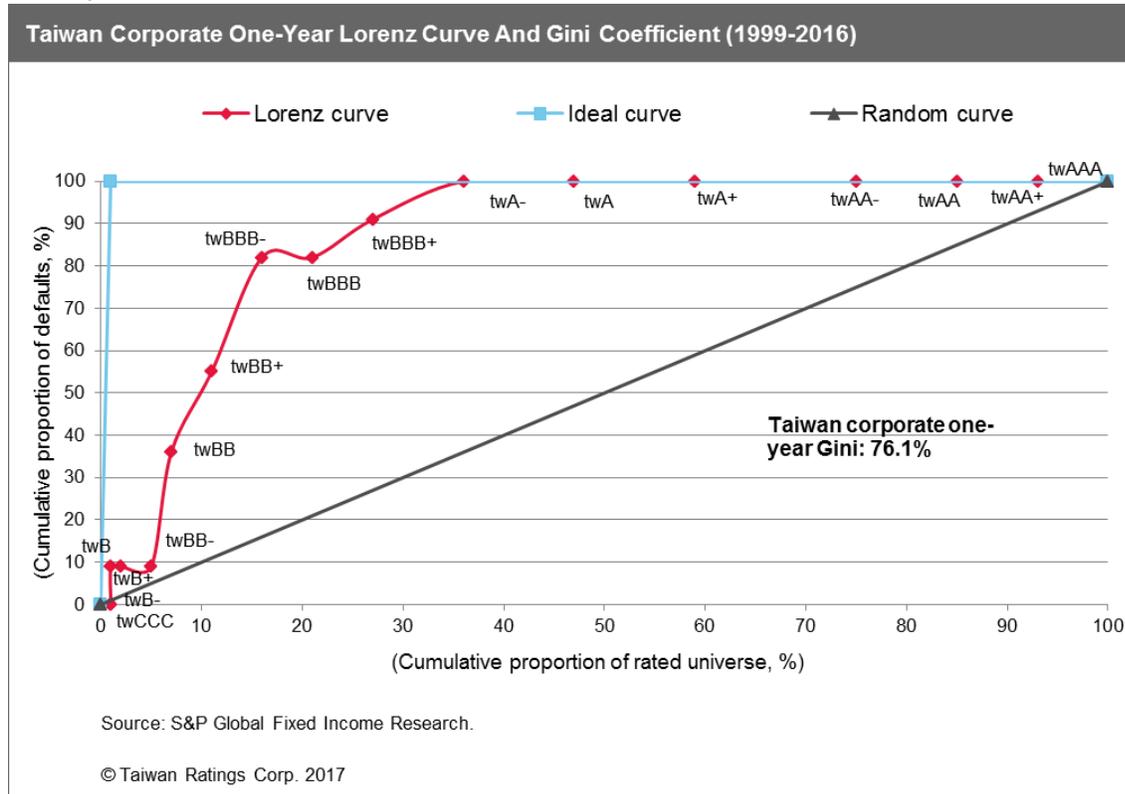


Chart 3 | [Download](#)

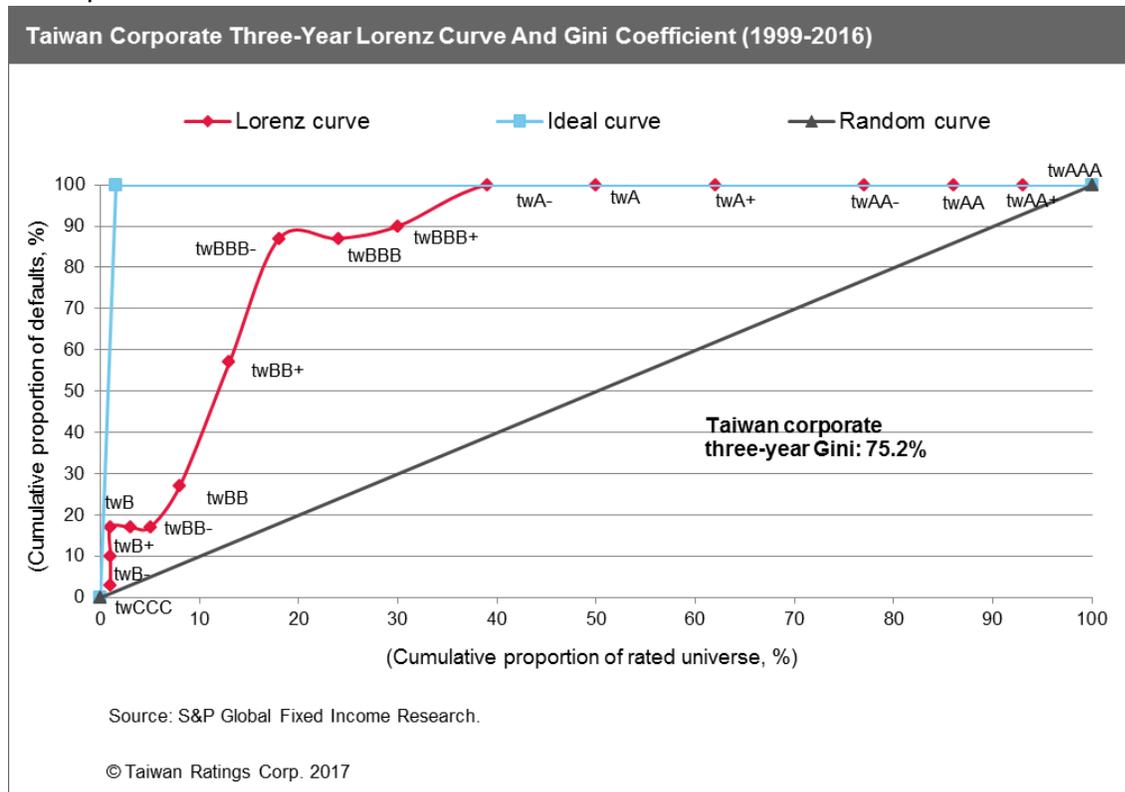
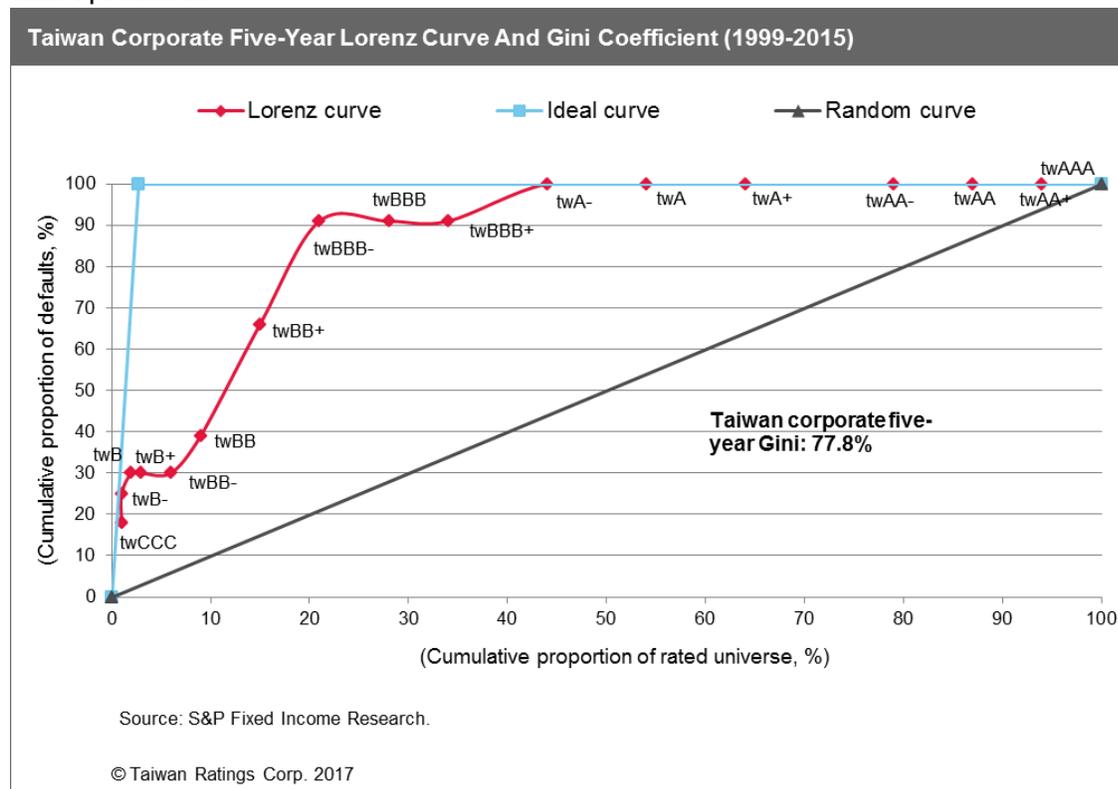


Chart 4 | [Download](#)



### 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 Fixed Income Research's default studies. The higher the rating, the lower the incidence of default. This relationship remains even for a smaller rated population, as is the case with Taiwan-based entities. One exception is the 'twCCC'/'twCC' category, due to its very small data set. Here, we do not see any default activity for those ratings 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 | [Download](#)

Taiwan Cumulative Average Default Rates (1999-2016)										
	--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	0.15	0.31	0.48	0.66	0.87	1.09	1.34	1.34	1.34	1.34
twBBB	1.14	2.61	3.50	4.12	4.12	4.45	5.15	5.90	6.71	6.71
twBB	2.70	4.86	6.49	7.03	8.65	10.30	11.97	13.09	13.66	13.66
twB	2.56	7.69	10.26	10.26	12.82	15.38	20.67	25.96	28.81	28.81
twCCC/C	0.00	0.00	9.09	45.45	72.73	90.91	100.00	N/A	N/A	N/A
Investment grade	0.26	0.60	0.85	1.05	1.12	1.28	1.54	1.74	1.97	1.97
Speculative grade	2.55	5.11	7.23	9.36	12.34	14.93	17.56	19.33	20.23	20.23
All rated	0.52	1.12	1.60	2.06	2.55	3.09	3.76	4.25	4.62	4.62

N/A--Not applicable. Source: S&P Global Fixed Income Research. © Taiwan Ratings Corp. 2017

## 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 Fixed Income Research default studies, in that there is a clear correspondence between higher ratings and lower default activity. This relationship holds over shorter time periods, as well as longer. 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 95% of 'twAA' rated issuers maintain this rating one year later, compared with 59% of 'twBB' rated issuers. This general relationship is also true over longer horizons. A key observation when analyzing transition matrices that present averages computed over multiple static pools is that the standard deviations associated with each transition point in the matrix are large relative to the averages (outside of stability rates).

Table 5 | [Download](#)

Average One-Year Transition Rates (%)									
<i>Taiwan Ratings Corp.'s Issuer Ratings (1999-2016)</i>									
From/To	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	87.67 (15.04)	8.22 (13.39)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	4.11 (6.30)
twAA	1.65 (2.05)	94.92 (3.51)	1.10 (1.26)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	2.34 (2.15)
twA	0.00 (0.00)	6.07 (6.55)	87.26 (7.19)	1.93 (3.07)	0.15 (0.51)	0.00 (0.00)	0.00 (0.00)	0.15 (0.55)	4.44 (3.96)
twBBB	0.00 (0.00)	0.29 (1.10)	9.43 (20.87)	75.71 (22.88)	1.43 (1.99)	0.00 (0.00)	0.00 (0.00)	1.14 (3.22)	12.00 (10.75)
twBB	0.00 (0.00)	0.00 (0.00)	0.54 (1.35)	12.43 (17.27)	59.46 (27.28)	0.54 (2.82)	0.54 (1.18)	2.70 (6.79)	23.78 (17.13)
twB	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	7.69 (9.73)	46.15 (31.61)	7.69 (16.96)	2.56 (9.32)	35.90 (35.66)
twCCC/CC	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	36.36 (44.26)	0.00 (0.00)	63.64 (44.26)	0.00 (0.00)	0.00 (0.00)

Source: S&P Global Fixed Income Research. © Taiwan Ratings Corp. 2017

*Default, Transition, and Recovery: 2016 Annual Taiwan Ratings Corp. Corporate Default Study  
And Rating Transitions*

**Table 6 | [Download](#)**

<b>Average Three-Year Transition Rates (%)</b>									
<i>Taiwan Ratings Corp.'s Issuer Ratings (1999-2016)</i>									
<b>From/To</b>	<b>twAAA</b>	<b>twAA</b>	<b>twA</b>	<b>twBBB</b>	<b>twBB</b>	<b>twB</b>	<b>twCCC/CC</b>	<b>D</b>	<b>NR</b>
twAAA	68.85	20.49	0.00	0.00	0.00	0.00	0.00	0.00	10.66
	(22.82)	(22.82)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(9.34)
twAA	4.19	87.42	2.35	0.00	0.00	0.00	0.00	0.00	6.04
	(3.88)	(4.66)	(1.35)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(2.47)
twA	0.00	14.07	68.27	4.46	0.69	0.00	0.00	0.51	12.01
	(0.00)	(12.46)	(11.58)	(4.89)	(1.40)	(0.00)	(0.00)	(0.89)	(3.41)
twBBB	0.00	3.01	21.08	42.17	2.11	0.00	0.00	3.01	28.61
	(0.00)	(3.76)	(26.12)	(25.50)	(3.81)	(0.00)	(0.00)	(5.05)	(15.00)
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)

Source: S&P Global Fixed Income Research. © Taiwan Rating Corp. 2017

**Table 7 | [Download](#)**

<b>Average Five-Year Transition Rates (%)</b>									
<i>Taiwan Ratings Corp.'s Issuer Ratings (1999-2016)</i>									
<b>From/To</b>	<b>twAAA</b>	<b>twAA</b>	<b>twA</b>	<b>twBBB</b>	<b>twBB</b>	<b>twB</b>	<b>twCCC/CC</b>	<b>D</b>	<b>NR</b>
twAAA	58.00	29.00	0.00	0.00	0.00	0.00	0.00	0.00	13.00
	(20.91)	(21.91)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(10.67)
twAA	5.89	82.11	2.74	0.00	0.00	0.00	0.00	0.00	9.26
	(6.01)	(6.04)	(1.57)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(2.66)
twA	0.00	18.09	56.10	4.27	0.61	0.00	0.00	0.81	20.12
	(0.00)	(14.92)	(16.58)	(3.62)	(1.18)	(0.00)	(0.00)	(0.95)	(6.16)
twBBB	0.00	7.03	26.52	24.92	0.32	0.00	0.00	3.51	37.70
	(0.00)	(6.62)	(26.44)	(17.03)	(1.57)	(0.00)	(0.00)	(5.28)	(18.02)
twBB	0.00	1.08	7.57	20.00	3.78	0.00	0.00	8.65	58.92
	(0.00)	(1.63)	(7.79)	(12.48)	(4.10)	(0.00)	(0.00)	(13.21)	(14.81)
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)

Source: S&P Global Fixed Income Research. © Taiwan Ratings Corp. 2017

Table 8 | [Download](#)

Average Ten-Year Transition Rates (%)									
<i>Taiwan Ratings Corp.'s issuer ratings (1999-2016)</i>									
From/To	twAAA	twAA	twA	twBBB	twBB	twB	twCCC/CC	D	NR
twAAA	44.44	40.74	0.00	0.00	0.00	0.00	0.00	0.00	14.81
	(15.78)	(5.60)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(12.39)
twAA	5.37	75.12	2.93	0.00	0.00	0.00	0.00	0.00	16.59
	(5.95)	(5.23)	(3.86)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(5.64)
twA	0.00	27.78	36.67	4.07	0.00	0.00	0.00	1.11	30.37
	(0.00)	(13.25)	(12.31)	(2.40)	(0.00)	(0.00)	(0.00)	(1.02)	(12.11)
twBBB	1.29	14.22	24.57	12.93	0.00	0.00	0.00	7.76	39.22
	(1.55)	(5.95)	(14.77)	(5.38)	(0.00)	(0.00)	(0.00)	(6.36)	(14.15)
twBB	0.00	2.34	3.51	6.43	0.00	0.00	0.00	13.45	74.27
	(0.00)	(2.53)	(3.66)	(5.38)	(0.00)	(0.00)	(0.00)	(9.55)	(5.20)
twB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.30	69.70
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(33.30)	(33.30)
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)

Source: S&P Global Fixed Income Research. © Taiwan Ratings Corp. 2017

## 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 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.

S&P Global Fixed Income Research's 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*

The study analyzes the rating histories of 282 companies on which TRC had assigned ratings as of Dec. 31, 1998, or that were first rated between that date and Dec. 31, 2016. 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 whose ratings 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 subject of separate default and transition studies and are excluded from this study.

To avoid over-counting, we exclude subsidiaries with debt that is fully guaranteed by a parent or with default risk that is considered identical to that of their parents, 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 as 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' following a company's default on the corresponding obligation. In addition, 'SD' is used whenever we believe 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' 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. 'D', 'SD', and 'R' issuer ratings are deemed defaults for the purpose 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*

S&P Global Fixed Income Research conducts its 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 back to all of the static pools to which the issuer belongs.

We use the static pool methodology to avoid certain pitfalls in estimating default rates, to ensure that default rates account for rating migration, and to allow default rates to be calculated across multi-period 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--this may yield comparatively low default rates during periods of high rating activity because it ignores 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 new update revises results back to the same starting date of Dec. 31, 1998, to avoid continuity problems.

Entities that have had ratings withdrawn--that is, revised to NR (not rated)--are surveyed 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. 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 2001-2016.

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. This 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 our 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 18 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 a more useful measure 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 non-defaulters) 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 (non-defaulters).

#### *Time sample*

This update limits the reporting of default rates to the selected time horizon; however, the data have been gathered for 18 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 ratings at the beginning of a time period with 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, 2016, had 18 one-year transitions, while companies first rated between Jan. 1, 2016, and Dec. 31, 2016 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 left-most 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 that 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 future rating distributions and may be better suited for certain applications than one-year transition matrices.

#### *Comparing transition rates with default rates*

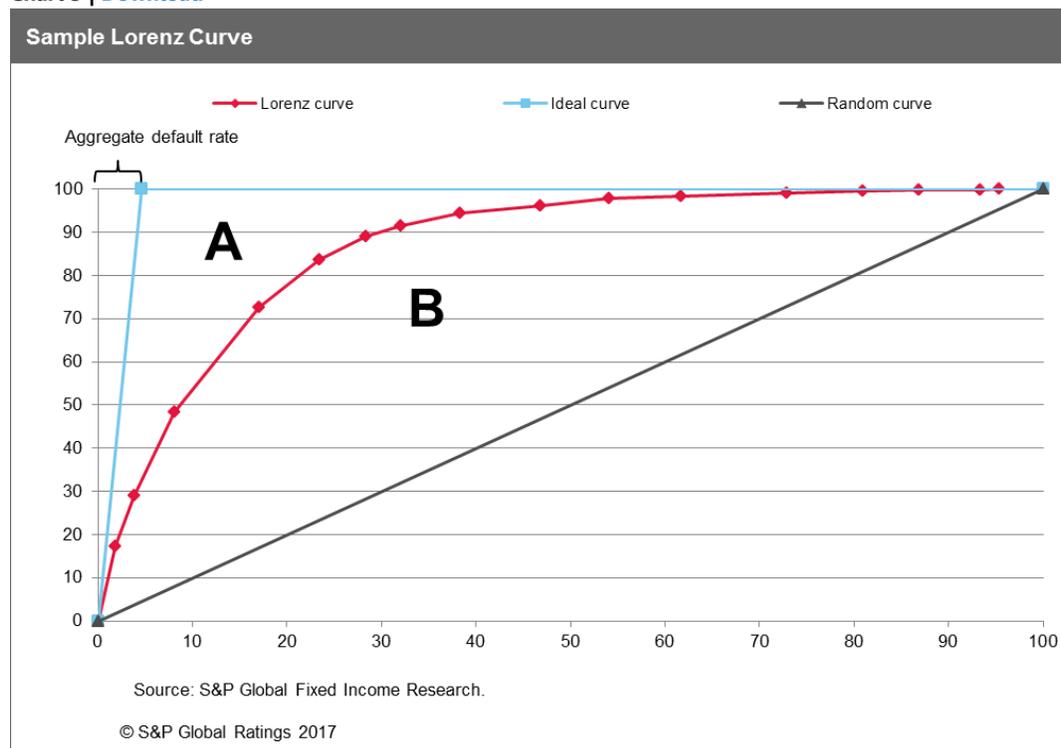
Rating transition rates may be compared with the marginal and cumulative default rates described in the previous section. For example, the one-year default rate column of table 4 is equivalent to column 'D' of the average one-year transition matrix in table 5. Average cumulative default rates are the summary of all static pools from 1998-2016, 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 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 S&P Global Ratings' corporate ratings only randomly approximated default risk, the Lorenz curve would fall along the diagonal. Its 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 one (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 areas A plus 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 | [Download](#)



## **Related Research**

- 2016 Annual Global Corporate Default Study And Rating Transitions - April 13, 2017
- 2016 Ratings Roundup Report, [www.taiwanratings.com](http://www.taiwanratings.com) - January 1, 2017
- Hua Nan Financial Holdings Co. Ltd. And Key Subsidiaries Upgraded On Strong Capitalization; Outlook Stable - May 12, 2016
- Solar Applied Materials Technology Corp. Downgraded To 'twCCC-' On Further Governance Problems; Still On WatchNeg - May 17, 2016

(Unless otherwise stated, these articles are published on [www.standardandpoors.com](http://www.standardandpoors.com), access to which requires a registered account)

*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.*

*Only a rating committee may determine a rating action and this report does not constitute a rating action.*

Copyright © 2017 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.

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](http://www.taiwanratings.com) (free of charge), and [irs.taiwanratings.com.tw](http://irs.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.