



NEWS RELEASE

June 22, 2001

The Relationship Between Ratings and Default

The Broad-Definition Default Ratio, the Rating Transition Matrix, and the Credit Risk Ratio

Last year Rating and Investment Information, Inc. (R&I), began to publicly announce the broad-definition default ratio as an indicator of the proportion of fundamental inability to make payment on corporate debts. Data for fiscal 2000 (April 1, 2000, to March 31, 2001) have now been added. Results show that the default ratio for issuing companies with ratings of BBB or higher was zero, and that for issuers rated BB or lower was 6.0%. For the cumulative default ratio as well, it is clear that the lower the rating, the higher the default ratio. In this way, the correlation between the default ratio and ratings has become more evident.

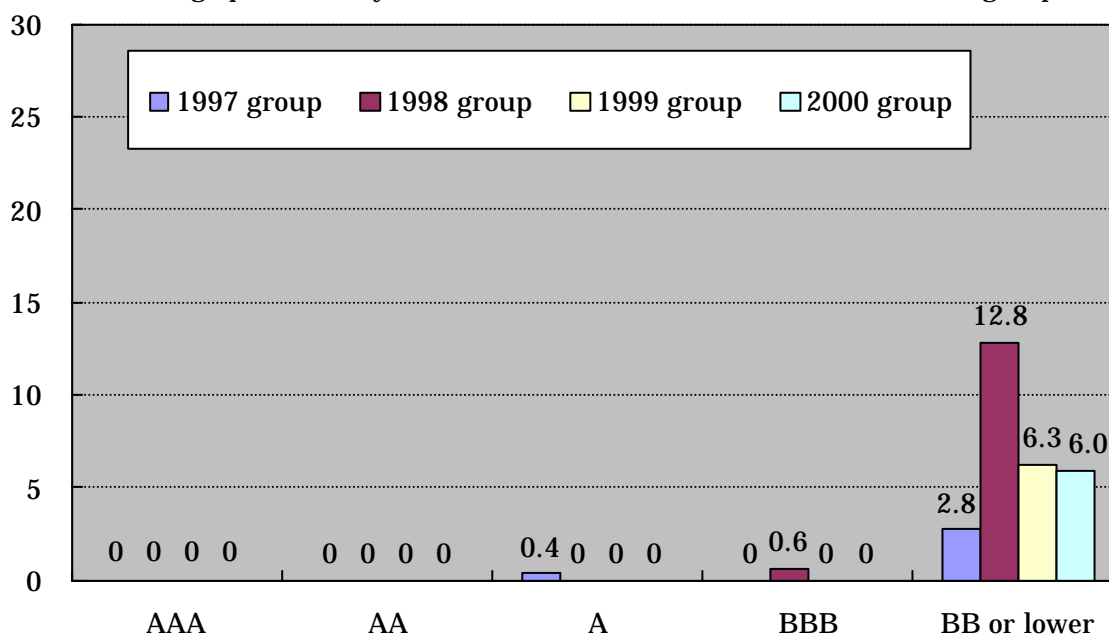
The calculation of the broad-definition default ratio is performed using data from R&I's rating transition matrix. It is now possible to download rating transition matrix data. R&I has amended the format slightly this year, and a breakdown by notch and by default definition of the numbers of issuers whose ratings have changed is now given.

The credit risk ratio is the proportion of companies that have been assigned an R&I rating and that subsequently experienced financial difficulties over a fixed period of time. Prior to the introduction of the broad-definition default ratio, the credit risk ratio was calculated as an alternative indicator of default in lieu of the default ratio. Data for fiscal 1990 to fiscal 1999 have now been added. Their addition has served to reconfirm the existence of a clear correlation between ratings and the credit risk ratio.

It is thought that clarifying the relationship between ratings and default on the basis of actual historical values is an important element of developing a foundation for the bond market. Such data can be downloaded from R&I's web site, and the company intends to continue making this kind of information openly available.

Exhibit 1

(%) Rating-specific one-year broad-definition default ratios for annual groups



1. The broad-definition default ratio

1.1 The broad-definition default ratio in fiscal 2000

The broad-definition default ratio (henceforth referred to as the “default ratio”) refers to the proportion of fundamental inability to make payment on corporate debts. Currently, at a time when it is said that there are few cases of defaulting on publicly offered corporate bonds, this instrument serves to indicate the proportion of potential default on corporate bonds. The companies covered include all of the issuers domiciled in Japan that have had an R&I long-term debt rating. The total number of such companies from April 1, 1978, to April 1, 2000, was 1,166. Of these, 729 companies had ratings as of April 1, 2000.

In performing the calculation, issuers that fit the definition given in Exhibit 2 are regarded as being in default. This definition provides a detailed enumeration of circumstances in which third-party economic loss is incurred due to fundamental default. Exhibit 3 shows changes in the number of cases of default in accordance with this definition. In fiscal 2000 there were 14 cases, which was double the previous year’s figure and the highest level ever recorded.

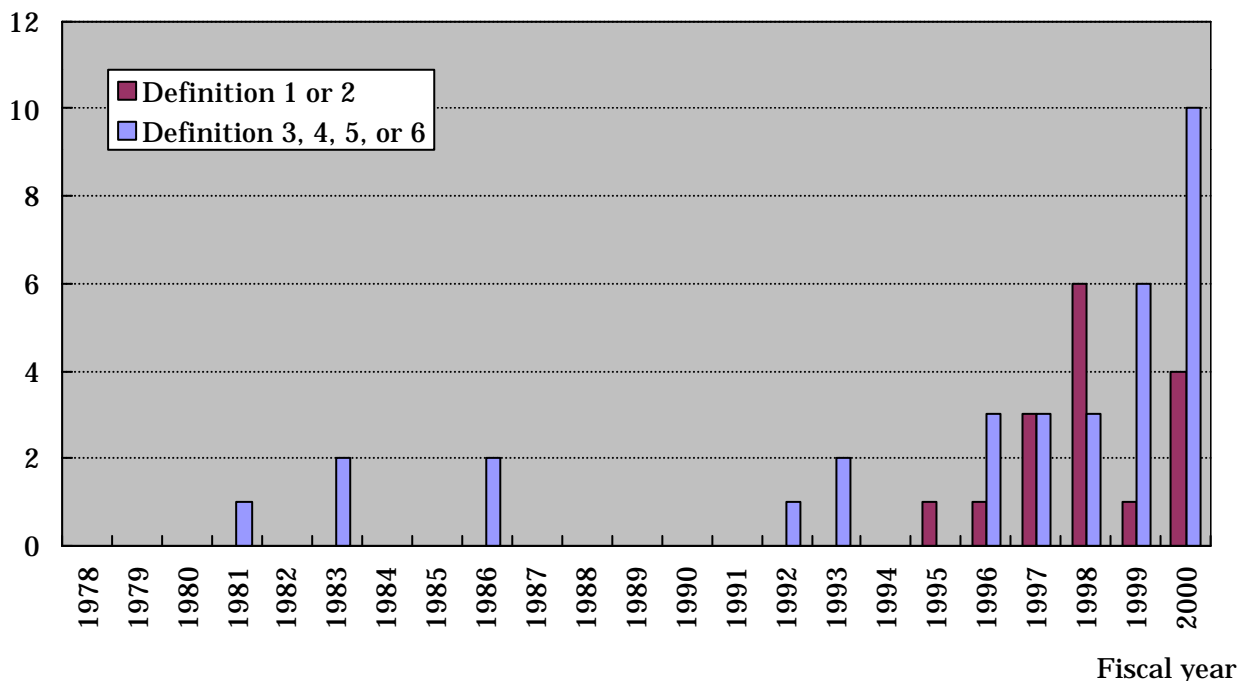
Four of the 14 companies fit definition 1 or definition 2, which are typically regarded as

Exhibit 2

Definition of the broad-definition default ratio

- (1) Bond default
- (2) Legal bankruptcy
 - (a) Court application for bankruptcy
 - (b) Court application to come under the protection of the Corporate Reorganization Law
 - (c) Court application to come under the protection of the Civil Rehabilitation Law (under the Composition Act prior to April 2000)
 - (d) Court application for special liquidation measures to commence
 - (e) Court application for liquidation procedures under commercial law to commence
 - (f) Discretionary liquidation after a first nonpayment
 - (g) Receipt of an order terminating bank dealings following a second nonpayment
 - (h) Internal liquidation even without nonpayment (i.e., when a company representative acknowledges a state of bankruptcy)
 - (i) Being brought under state control
 - (j) Voluntary termination of business
- (3) Abandonment of claims
- (4) Emergency merger or transfer of key operating assets (when the assets do not have any value)
- (5) Infusion of capital to avoid having negative equity
- (6) A position of negative equity (when this is followed by the receipt of financial assistance to avoid bankruptcy)

Exhibit 3
Incidence of broad-definition default



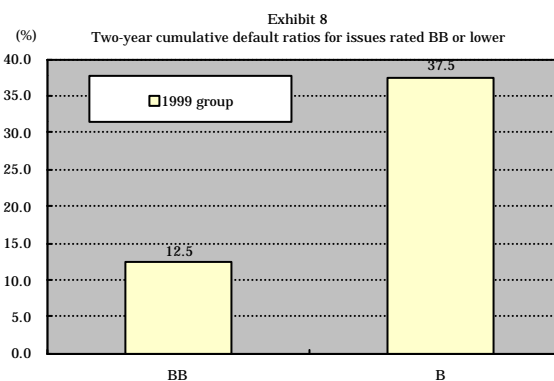
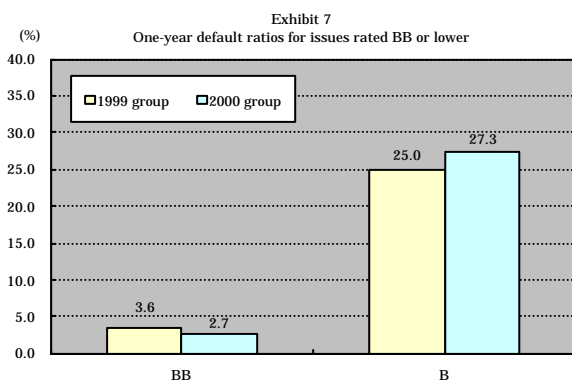
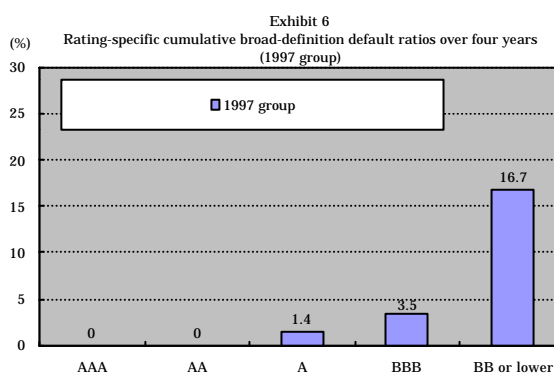
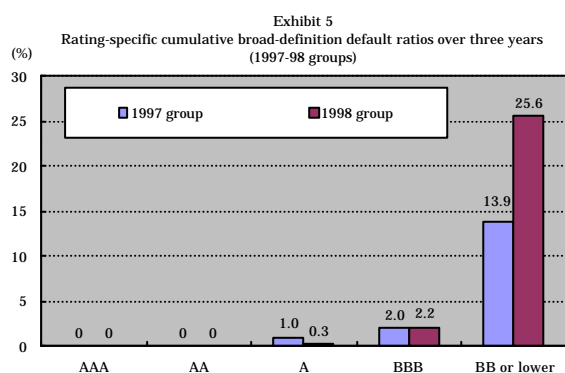
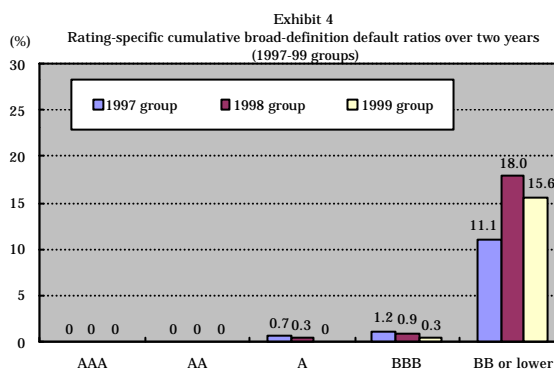
bankruptcy. Two of these, Kawaden Corp. and Marutomi Group Co., Ltd., defaulted on corporate bonds that had been rated. Both of them as well as the other 2 companies, Akai Electric Co., Ltd., and Ikegai Corp., filed for bankruptcy under the Civil Rehabilitation Law, which went into effect in April 2000. The other 10 cases of default fell into one of the definition's expanded "broad" interpretations, that is, definitions 3 through 6. As in fiscal 1998 and 1999, there were many construction companies on which claims had been abandoned.

Of the 14 cases, 5 involved bond issues that had a rating at the start of fiscal 2000. Each was rated BB or lower. In the other 9 cases, the companies had obtained ratings at least one year earlier (on or before March 31, 2000). The impact of their default status is reflected in the revision of the cumulative default ratios for two years and longer.

1.2 Results of the broad-definition default ratio calculation

Exhibit 1 on the first page of this news release presents the rating-specific one-year default ratios for annual groups. It shows the proportion of default among issuers with identical ratings at the outset of each fiscal year. In the case of the fiscal 2000 group, this proportion was zero for ratings of BBB and higher and 6.0% for ratings of BB or lower. The fact that default was more probable for issuers with a low rating continued a pattern seen up through fiscal 1999.

Additionally, for the cumulative default ratios for annual groups over two years and longer, there was a clear gap among different ratings (Exhibits 4, 5, and 6). Along with the increased number of issuers in the sample rated BB or lower, the default ratios for a further breakdown into BB and B ratings were also calculated for the 1999 and 2000 groups (Exhibits 7 and 8). The number of issuers in the B sample was 8 companies in the 1999 group and 11 in the 2000 group. It should be pointed out that just one case of default causes





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the default ratio to change by as much as 10 percentage points. Nevertheless, it is apparent that a difference also existed between the BB and B ratings.

2. The rating transition matrix

The rating transition matrix is a table that shows how ratings assigned to issuers change over a fixed period of time and the extent of change for each rating. Exhibit 9 is a concrete example of a rating transition matrix. It indicates what specific issuers' ratings as of April 1, 2000, had become one year later, on April 1, 2001. For example, on April 1, 2000, there were 46 companies with a BB+ rating. Of these, 32 still had a BB+ rating on April 1, 2001, while 1 had moved to BBB- and 1 to BB. Of the 12 remaining issuers, 1 fit definition 5 of broad-definition default, and the other 11 did not have a rating on April 1, 2001.

The broad-definition default ratio is produced by using a portion of the data from this rating transition matrix. Exhibit 9 shows that the total number of companies considered cases of broad-definition default (the numbers appear in columns "BD1" through "BD6") was five. All five of these issuers were in the BB zone or lower on April 1, 2000. Meanwhile, as the exhibit's "Total" column shows, a total of 84 companies had a rating of BB or lower on that date. Accordingly, the broad-definition default ratio for the BB zone and lower can be calculated as 6.0% (5 / 84).

Broad-definition default is not the same as actual default, so there are instances when an actual rating exists even though an issuer is treated as a case of broad-definition default. In Exhibit 9, when an issuer with an existing rating is regarded as a case of broad-definition default, its status for the final year of the calculation is not categorized under the actual rating but in the "default" column. To give an extreme example, even an issuer with an actual rating of C will be tallied in the "BD1" column and not in the one for a C rating if that issuer fits definition 1 of broad-definition default. (The data that can be downloaded are available not only in the format shown in Exhibit 9 but also as a matrix that consists solely of actual ratings and omits any consideration of the concept of broad-definition default.)

Exhibit 9: Sample rating transition matrix

First survey year		Final survey year		Rating on April 1 of the final survey year																	Cumulative no. of companies fitting definition 1, 2, 3, 4, 5, or 6 of broad-definition default through April 1 of the final survey year						No. of companies with no rating on April 1 of the final survey year	TOTAL			
(2000)	(2001)	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	CC	C	BD1	BD2	BD3	BD4	BD5	BD6	(NR)	TOTAL	
Rating on April 1 of the first survey year	AAA	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
	AA+	0	16	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	20
	AA	0	1	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27
	AA-	0	0	0	35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	41	
	A+	0	0	0	2	57	5	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	71	
	A	0	0	0	1	4	70	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	86	
	A-	0	0	1	0	1	2	89	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	106	
	BBB+	0	0	0	0	0	0	3	70	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	85	
	BBB	0	0	0	0	0	0	4	75	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	93	
	BBB-	0	0	0	0	0	0	0	6	71	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	98	
	BB+	0	0	0	0	0	0	0	0	0	1	32	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	46	
	BB	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	
	BB-	0	0	0	0	0	0	0	0	0	0	0	0	9	0	1	0	0	0	0	0	0	0	0	0	0	0	1	4	15	
	B+	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	
	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	0	0	6	
	B-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	CCC+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CCC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CCC-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

3. The credit risk ratio

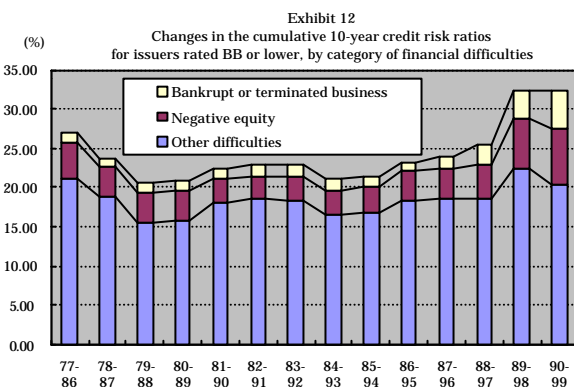
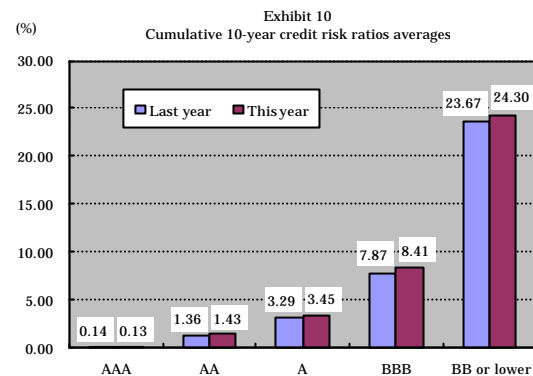
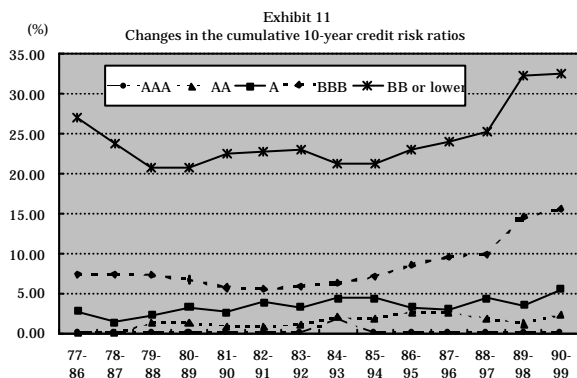
3.1 Results of the calculation

The credit risk ratio is the proportion of companies assigned an R&I rating that subsequently experienced financial difficulties over a fixed period of time. The total span of time measured was 23 years, from fiscal 1977 to fiscal 1999. The ratio covered listed companies and those on the over-the-counter market, with the exception of financial institutions, trading companies, electrical

power and gas utilities, and major private railways. The ratings for companies not rated by R&I were estimated using scores based on factor analysis and principal component analysis.

The existing credit risk ratio has been expanded to include data for the period from fiscal 1990 to fiscal 1999 (Exhibit 10). Exhibit 11 shows movement in the cumulative 10-year credit risk ratios. The credit risk ratios for issuers rated BBB and those rated BB or lower were still at a high level, although the size of the increase has eased off slightly. While there was a slight upturn in the credit risk ratios for AA and A issues, the movement was smaller than for issues with lower ratings.

Exhibit 12 presents a breakdown of changes in the credit risk ratio in terms of the number of firms that have gone bankrupt, those that have negative equity (excluding cases of bankruptcy), and others (those that have recorded either three consecutive years of pretax losses or three consecutive years of deficits in their balance of current income to current expenditure). As the exhibit shows, the proportion of companies declaring bankruptcy or with liabilities in excess of assets is rising.



3.2 The differences between the broad-definition default ratio and the credit risk ratio

The credit risk ratio was created as a quantitative indicator of credit risk using various processes in early 1997, at which time there were fewer cases of corporate failure than there are now. As could also be confirmed with the addition of updated data, the credit risk ratio has shown a clear correlation between R&I ratings and corporate creditworthiness. Subsequently, with such developments as the accumulation of cases of corporate failure and the expansion of R&I ratings coverage, the broad-definition default ratio was introduced as a default ratio closer to actuality.

Exhibit 13 outlines the differences between the broad-definition default ratio and the credit risk ratio. A major distinction is the pool of companies covered. As noted previously, the credit risk ratio does not cover all business sectors. The broad-definition default ratio, however, has less of a bias in terms of the business sectors of the companies that it covers, because it targets just publicly announced ratings and does not use a rating estimation model. Another difference between the two ratios is how up-to-date the data are. The credit risk ratio is based on 10-year follow-up measurements, so the newest data are for the period from the start of fiscal 1990 to the end of fiscal 2000. This means that the information is currently limited to the subsequent performance of 1990 ratings, with no coverage of any later ratings, so that recent rating behavior is not reflected. The calculation of the broad-definition default ratio, on the other hand, includes data up through the most recent period. The small size of its sample is a weakness of the broad-definition default



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ratio. As can be seen in the results of the recent update, though, this shortcoming is apt to be resolved as the years pass.

Exhibit 13: The differences between the credit risk ratio and the broad-definition default ratio

	Credit risk ratio	Broad-definition default ratio
Companies covered	Listed and over-the-counter-market companies (excluding financial institutions, trading companies, electric power and gas utilities, and major private railways)	All companies with publicly announced R&I ratings
Ratings	Includes ratings estimated from financial data	Only publicly announced R&I ratings
Most recent starting point	April 1, 1990	April 1, 2000
Methodology	Count the no. of companies that experienced financial difficulties (1) Bankruptcy, etc. (legal bankruptcy and defunctness due to an emergency merger) (2) Negative equity (3) 3 consecutive years of pretax losses (4) 3 consecutive years of deficits in the balance of current income to current expenditure (Note: Cases 3 and 4 are each given a weighting of 0.5.)	Count the no. of instances judged as being actual bond default (1) Bond default (2) Legal bankruptcy (including nationalization of financial institutions and voluntary termination of business) (3) Abandonment of claims (4) Emergency merger or transfer of key operating assets (when the assets do not have any value) (5) Infusion of capital to avoid having negative equity (6) A position of negative equity (when this is followed by the receipt of financial assistance to avoid bankruptcy)

4. Methodologies

4.1 The broad-definition default ratio

4.1.1 Ratings

The calculation is based on senior long-term debt ratings. It does not include municipal bond ratings, ratings for the ability to pay insurance claims, and ratings for asset-backed securities. Furthermore, ratings for bonds backed by guarantees by parent companies, banks, or financial guarantee companies are not included. For the period up through March 31, 1998, the calculation uses ratings issued by the Japan Bond Research Institute (JBRI) and Nippon Investors Services (NIS), which are the two companies whose merger created R&I. It also includes publicly announced trial ratings assigned prior to these two companies' commencement of business ratings. In the event that there are ratings from both companies, the lower of the two is used.

4.1.2 The companies covered

The issuing companies covered include all of the issuers domiciled in Japan that have had an R&I long-term debt rating. The total number of such companies from April 1, 1978, to April 1, 2000, was 1,166. Of these, 729 companies had current ratings as of April 1, 2000. Issuing companies that have only had a short-term debt rating are excluded.

The long-term ratings data is managed in R&I's Bond Rating Data Base.

4.1.3 The calculation method

The groups that appear in Exhibit 1 and elsewhere each indicate a grouping for a default ratio survey. Each group has been named according to the first fiscal year of its survey period. For example, the 1997 group refers to the group of 821 companies that had R&I ratings as of April 1, 1997.

The survey starts on April 1 of each year from 1978 to 2000. This produces a total of 23 sets of survey results.

Each group is further broken down into its ratings as of the survey's starting point. The number of cases of default over the years that have elapsed since the survey began is tallied for each rating. The figure for each rating is then divided by the total number of issuers that initially held that rating. This process yields rating-specific cumulative default ratios for individual groups.

To use the 1997 group as an example, its 821 issuing companies can be broken down by their initial ratings as follows: 30 companies had an AAA rating, 120 an AA, 288 an A, 347 a BBB, and 36 a rating of BB or lower. Of the 36 issuers with a rating of BB or lower, 1 company had defaulted within one year, 4 within two years, 5 within three years, and 6 within four years. When each of

these figures is divided by the original total of 36 companies, this yields cumulative default ratios for each of the four years of 2.8%, 11.1%, 13.9%, and 16.7%, respectively.

4.1.4 The calculation method for the cumulative average default ratio

The calculation of the cumulative average default ratios given in Appendix A.1 was performed as follows. First, data such as those in Exhibit 14 were prepared. Exhibit 14 shows the data for the 1997 group. The number “3” that appears in the row labeled “BB or lower” and in the column for the second year indicates that 3 of the 36 companies with a rating of BB or lower on April 1, 1997, defaulted during the second year. It should be noted that this number is *not* the cumulative default figure through the second year. This data then served as the basis for computing the default ratios in the nth years, which are shown in Exhibit 15. For example, the proportion of issuers rated BB or lower who actually defaulted in the second year was 8.3% (3 / 36). The proportion thus calculated is referred to as the nth-year default ratio. It is clear from the definition of the nth-year default ratio that adding up the nth-year default ratios when “n” is equivalent to 1 through 10 will produce a figure that corresponds to the 10-year cumulative broad-definition default ratio. In this way, the nth-year default ratios for each group are calculated in the same way as for the 1997 group in Exhibit 15. There is an upper limit, though, on “n” for each group. For example, the ratio calculation for the 1997 group can only be done through the fourth year (fiscal 2000).

The next step is to calculate the averages of the nth-year default ratios for all the annual groups. All 23 groups have a figure for n = 1, the first year, but only 22 groups have a figure for n = 2. That is, the number of groups included in each average declines as “n” increases. Additionally, the averages are weighted to compensate for the different sizes of the sample groups. The results of this process, the average nth-year default ratios, are shown in Exhibit 16. From this, it is possible to calculate, for example, the 10-year cumulative average default ratios by adding up the broad-definition default ratios for each year from the first to the tenth. Exhibit 17 presents the results of performing such a calculation to determine the cumulative average default ratios through each successive year.

The rationale behind this methodology is that it utilizes all of the data presently available. The 1997 group, for example, consists of the results of four years’ worth of rating surveys. But to a certain extent, this 1997 data also includes information for the cumulative default ratios for five- and six-year periods. This is because a cumulative default ratio of 1% for a four-year period can be interpreted to mean that the default ratio over a period of five or more years will never be anything less than 1%. By calculating nth-year default ratios for individual groups as previously described, then finding the averages of all of the groups’ nth-year default ratios, and subsequently producing cumulative figures from these nth-year averages, then four years’ worth of default information for the 1997 group can be used to establish data for the cumulative default ratios for periods of five years or longer. On the other hand, if the method that is used begins with calculating the cumulative default ratios for individual groups and after that computes the averages of these ratios, then information on the 1997 group will no longer be reflected in the cumulative default ratios for five years or longer.

Exhibit 14: No. of companies defaulting in the nth years

1997 group	Year 1	Year 2	Year 3	Year 4	No. in sample
AAA	0	0	0	0	30
AA	0	0	0	0	120
A	1	1	1	1	288
BBB	0	4	3	5	347
BB or lower	1	3	1	1	36

Exhibit 15: Default ratios in the nth years (%)

1997 group	Year 1	Year 2	Year 3	Year 4	No. in sample
AAA	0.0	0.0	0.0	0.0	30
AA	0.0	0.0	0.0	0.0	120
A	0.3	0.3	0.3	0.3	288
BBB	0.0	1.2	0.9	1.4	347
BB or lower	2.8	8.3	2.8	2.8	36

Exhibit 16: Average nth-year default ratios (%)

Average	Year 1	Year 2	Year 3	Year 4
AAA	0.0	0.0	0.0	0.0
AA	0.0	0.0	0.1	0.1
A	0.0	0.1	0.2	0.3
BBB	0.1	0.3	0.3	0.4
BB or lower	2.1	1.9	1.5	1.0

Exhibit 17: Cumulative average default ratios (%)

Average	After 1 year	After 2 year	After 3 year	After 4 year
AAA	0.0	0.0	0.0	0.0
AA	0.0	0.0	0.1	0.2
A	0.0	0.1	0.3	0.6
BBB	0.1	0.4	0.7	1.1
BB or lower	2.1	4.0	5.5	6.5

4.2 The credit risk ratio

4.2.1 Cases regarded as financial difficulties

A company is regarded as having experienced financial difficulties if it has gone bankrupt or terminated business or has negative equity. Such a company is weighted as 1 case. If a company has recorded three consecutive years of pretax losses or three consecutive years of deficits in the balance of its current income to current expenditure, that occurrence is viewed as one out of two companies experiencing financial difficulties and is weighted as 0.5.

The rationale behind this system of weighting is as follows. First, a company that has negative equity is seen as having an extremely high likelihood of default, since there is no expectation at all of support from its main bank or any other source and no latent assets. Such a company is thus weighted as 1 case. When a company has recorded three consecutive years of pretax losses, though, default can be avoided by providing collateral, although this is contingent upon triggering a bridge clause in the issuing contract. Such a case is therefore weighted as 0.5. The cash flow of a company that has recorded three consecutive years of deficits in the balance of its current income to current expenditure will have deteriorated seriously, and the risk of default will have risen. This does not mean, however, that default is imminent, and thus the weighting given is 0.5.

It is possible for more than one of the above circumstances to apply to a single company. But even so, the weighting for a single company is never greater than 1.

4.2.2 The companies covered

The survey includes companies actually rated by the former JBRI and NIS and companies listed on the stock exchange and the over-the-counter market (a total of approximately 3,000 companies). Financial institutions, trading companies, electrical power and gas utilities, and major private railways are excluded, since the R&I rating estimation model is not applicable in such cases. The ratings for companies not rated by R&I are estimated on the basis of scores obtained through models using factor analysis and principal component analysis. The score threshold values used to determine these ratings are estimated from the scores of companies that were actually rated during the year in question.

4.2.3 The period measured

The calculation is based on 10-year periods. Specifically, it covers 14 groups spanning 10 fiscal years each: 1977 to 1986, 1978 to 1987, 1979 to 1988, 1980 to 1989, 1981 to 1990, 1982 to 1991, 1983 to 1992, 1984 to 1993, 1985 to 1994, 1986 to 1995, 1987 to 1996, 1988 to 1997, 1989 to 1998, and 1990 to 1999. Altogether the survey encompasses 23 years.

4.2.4 The calculation method

The companies in each group are broken down by ratings using the rating of each company at the outset of the group's survey period. Group credit risk ratios are computed by dividing the number of companies in each rating classification that experienced financial difficulties by the total number of companies in that rating classification. Exhibit 10 shows the simple averages of the 10-year cumulative credit risk ratios calculated for each of the 14 survey periods. Last year's figures are the simple averages of the 13 survey periods through the period that began in fiscal 1989 and ended in fiscal 1998.

4.3 To access the data

Detailed calculation results can be downloaded from R&I's web site (<http://www.r-i.co.jp/>). For a list of broad-definition default issuers not covered in this news release and the changes in their ratings, please contact R&I as follows.

Akira Ishiwata
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E-mail: ishiwata@r-i.co.jp

Appendix A

Broad-definition default ratios for each rating

A.1 Cumulative average broad-definition default ratios (%)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.43	0.66	0.92
AA	0.00	0.00	0.07	0.14	0.22	0.49	0.78	1.10	1.47	1.62
A	0.03	0.11	0.28	0.54	0.90	1.26	1.57	1.97	2.49	2.89
BBB	0.11	0.35	0.66	1.04	1.39	1.76	2.11	2.37	2.58	2.80
BB or lower	2.37	4.08	5.51	6.42	7.39	8.43	9.74	11.15	12.45	13.36

A.2 Broad-definition default ratios for each group (%)

2000 group (fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	-	-	-	-	-	-	-	-	-	18
AA	0.00	-	-	-	-	-	-	-	-	-	88
A	0.00	-	-	-	-	-	-	-	-	-	263
BBB	0.00	-	-	-	-	-	-	-	-	-	276
BB or lower	5.95	-	-	-	-	-	-	-	-	-	84

1999 group (fiscal 1999 and fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	-	-	-	-	-	-	-	-	24
AA	0.00	0.00	-	-	-	-	-	-	-	-	88
A	0.00	0.00	-	-	-	-	-	-	-	-	270
BBB	0.00	0.33	-	-	-	-	-	-	-	-	302
BB or lower	6.25	15.63	-	-	-	-	-	-	-	-	64

1998 group (fiscal 1998 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	-	-	-	-	-	-	-	29
AA	0.00	0.00	0.00	-	-	-	-	-	-	-	117
A	0.00	0.33	0.33	-	-	-	-	-	-	-	301
BBB	0.63	0.94	2.19	-	-	-	-	-	-	-	320
BB or lower	12.82	17.95	25.64	-	-	-	-	-	-	-	39

1997 group (fiscal 1997 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	-	-	-	-	-	-	30
AA	0.00	0.00	0.00	0.00	-	-	-	-	-	-	120
A	0.35	0.69	1.04	1.39	-	-	-	-	-	-	288
BBB	0.00	1.15	2.02	3.46	-	-	-	-	-	-	347
BB or lower	2.78	11.11	13.89	16.67	-	-	-	-	-	-	36

1996 group (fiscal 1996 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	29
AA	0.00	0.00	0.91	0.91	0.91	-	-	-	-	-	110
A	0.00	0.35	1.05	1.75	2.11	-	-	-	-	-	285
BBB	0.58	0.87	1.74	2.61	3.77	-	-	-	-	-	345
BB or lower	2.13	2.13	6.38	8.51	12.77	-	-	-	-	-	47

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1995 group (fiscal 1995 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	31
AA	0.00	0.00	0.00	0.99	0.99	0.99	-	-	-	-	101
A	0.00	0.00	0.37	0.74	1.11	1.85	-	-	-	-	271
BBB	0.00	0.58	0.86	2.02	2.88	4.03	-	-	-	-	347
BB or lower	2.38	2.38	4.76	4.76	7.14	11.90	-	-	-	-	42

1994 group (fiscal 1994 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	29
AA	0.00	0.00	0.00	0.00	0.91	0.91	0.91	-	-	-	110
A	0.00	0.00	0.00	0.77	1.93	2.32	3.09	-	-	-	259
BBB	0.00	0.00	0.66	0.66	1.66	2.66	3.99	-	-	-	301
BB or lower	0.00	2.70	2.70	5.41	5.41	8.11	13.51	-	-	-	37

1993 group (fiscal 1993 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	31
AA	0.00	0.00	0.00	0.00	0.00	0.89	0.89	0.89	-	-	112
A	0.00	0.00	0.00	0.00	0.79	1.98	2.77	3.95	-	-	253
BBB	0.80	0.80	0.80	1.61	1.61	2.81	3.21	4.02	-	-	249
BB or lower	0.00	0.00	3.13	3.13	3.13	3.13	6.25	12.50	-	-	32

1992 group (fiscal 1992 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	35
AA	0.00	0.00	0.00	0.00	0.00	1.68	3.36	3.36	3.36	-	119
A	0.00	0.00	0.00	0.00	0.00	0.00	0.81	1.62	3.24	-	247
BBB	0.00	0.86	0.86	1.29	2.16	2.16	3.45	3.88	4.31	-	232
BB or lower	0.00	0.00	0.00	0.00	3.70	3.70	7.41	11.11	18.52	-	27

1991 group (fiscal 1991 through fiscal 2000)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	2.38	2.38	2.38	2.38	42
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.91	2.73	2.73	2.73	110
A	0.00	0.00	0.89	0.89	1.33	1.33	1.33	2.22	3.11	4.89	225
BBB	0.00	0.00	0.00	0.00	0.00	0.89	0.89	1.79	2.23	2.68	224
BB or lower	0.00	0.00	0.00	0.00	0.00	3.70	7.41	11.11	14.81	18.52	27

1990 group (fiscal 1990 through fiscal 1999)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	4.44	4.44	45
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	1.85	1.85	108
A	0.00	0.00	0.00	1.01	1.01	1.52	1.52	1.52	2.02	2.53	198
BBB	0.00	0.00	0.41	0.41	0.41	0.41	1.23	1.23	2.46	2.87	244
BB or lower	0.00	0.00	0.00	0.00	0.00	0.00	4.17	8.33	8.33	12.50	24

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1989 group (fiscal 1989 through fiscal 1998)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56	39
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.27	2.27	88
A	0.00	0.00	0.00	0.00	1.18	1.18	1.76	1.76	1.76	1.76	170
BBB	0.00	0.00	0.00	0.36	0.36	0.36	0.36	1.09	1.45	2.55	275
BB or lower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	7.41	7.41	27

1988 group (fiscal 1988 through fiscal 1997)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.47	68
A	0.00	0.00	0.00	0.00	0.00	1.31	1.31	1.96	3.27	3.27	153
BBB	0.00	0.00	0.00	0.00	0.34	0.34	0.34	0.34	0.34	0.68	296
BB or lower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	7.41	27

1987 group (fiscal 1987 through fiscal 1996)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	117
BBB	0.00	0.00	0.00	0.00	0.00	0.37	0.37	0.37	0.37	0.37	271
BB or lower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.57	28

1986 group (fiscal 1986 through fiscal 1995)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96
BBB	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43	230
BB or lower	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	23

1985 group (fiscal 1985 through fiscal 1994)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	92
BBB	0.00	0.51	0.51	0.51	0.51	0.51	0.51	1.02	1.02	1.02	197
BB or lower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14

1984 group (fiscal 1984 through fiscal 1993)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	78
BBB	0.00	0.00	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	168
BB or lower	0.00	0.00	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	27

1983 group (fiscal 1983 through fiscal 1992)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74
BBB	0.00	0.00	0.00	0.65	0.65	0.65	0.65	0.65	0.65	0.65	155
BB or lower	2.78	2.78	2.78	5.56	5.56	5.56	5.56	5.56	5.56	5.56	36

1982 group (fiscal 1982 through fiscal 1991)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76
BBB	0.00	0.00	0.00	0.00	0.68	0.68	0.68	0.68	0.68	0.68	148
BB or lower	0.00	2.17	2.17	2.17	4.35	4.35	4.35	4.35	4.35	4.35	46

1981 group (fiscal 1981 through fiscal 1990)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73
BBB	0.00	0.00	0.00	0.00	0.00	0.74	0.74	0.74	0.74	0.74	136
BB or lower	2.13	2.13	4.26	4.26	4.26	6.38	6.38	6.38	6.38	6.38	47

1980 group (fiscal 1980 through fiscal 1989)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44
BBB	0.00	0.00	0.00	0.00	0.00	0.00	1.05	1.05	1.05	1.05	95
BB or lower	0.00	0.00	0.00	5.13	5.13	5.13	7.69	7.69	7.69	7.69	39

1979 group (fiscal 1979 through fiscal 1988)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45
BBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96
BB or lower	0.00	0.00	0.00	0.00	2.78	2.78	2.78	5.56	5.56	5.56	36

1978 group (fiscal 1978 through fiscal 1987)

Years elapsed	1	2	3	4	5	6	7	8	9	10	No. of issuers
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48
BBB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96
BB or lower	0.00	0.00	0.00	0.00	0.00	2.78	2.78	2.78	5.56	5.56	36

Appendix B

Credit risk ratios for each rating

B.1 Cumulative average credit risk ratios for all 14 groups to date (%)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
AA	0.07	0.24	0.42	0.55	0.68	0.81	0.94	1.16	1.30	1.43
A	0.17	0.40	0.68	1.00	1.36	1.70	2.11	2.58	2.99	3.45
BBB	0.55	1.11	1.70	2.48	3.45	4.44	5.45	6.44	7.43	8.41
BB or lower	4.64	8.39	10.73	12.94	15.15	17.21	19.18	21.02	22.73	24.30

B.2 Credit risk ratios for each group (%)

1990 group (fiscal 1990 through fiscal 1999)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	1.18	1.18	1.18	1.18	1.18	1.18	2.35	2.35	2.35
A	0.26	0.65	1.04	1.95	3.12	3.90	4.29	4.68	4.68	5.58
BBB	1.08	2.19	3.02	4.75	7.59	10.04	11.65	13.09	14.21	15.54
BB or lower	4.59	8.78	12.08	16.17	19.66	23.25	26.55	29.24	30.94	32.44

1989 group (fiscal 1989 through fiscal 1998)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
A	0.13	0.27	0.66	1.06	1.73	2.53	3.06	3.32	3.59	3.59
BBB	1.08	1.92	2.68	3.52	5.08	7.89	10.21	11.89	13.45	14.61
BB or lower	3.85	7.69	10.60	13.41	17.64	21.29	25.33	28.33	30.68	32.27

1988 group (fiscal 1988 through fiscal 1997)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	1.85	1.85	1.85	1.85	1.85	1.85	1.85
A	0.00	0.29	0.59	0.88	0.88	2.06	3.24	3.53	4.12	4.41
BBB	0.36	0.88	1.40	1.97	2.54	3.62	5.90	7.71	8.95	9.94
BB or lower	3.25	5.55	7.12	9.01	11.15	14.29	17.43	20.73	23.19	25.39

1987 group (fiscal 1987 through fiscal 1996)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	1.79	1.79	2.68	2.68	2.68	2.68
A	0.00	0.00	0.30	0.60	0.90	0.90	1.51	2.71	3.01	3.01
BBB	0.51	0.84	1.40	1.85	2.42	3.15	4.33	6.46	8.43	9.61
BB or lower	3.59	5.99	7.60	9.17	10.94	12.71	15.52	18.39	21.61	24.01

1986 group (fiscal 1986 through fiscal 1995)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	1.79	1.79	2.68	2.68	2.68
A	0.30	0.30	0.30	0.60	0.90	1.20	1.20	1.81	3.01	3.31
BBB	0.28	0.79	1.01	1.57	2.02	2.58	3.31	4.49	6.63	8.60
BB or lower	3.75	6.35	8.23	9.79	11.35	13.02	14.69	17.45	20.16	23.13

1985 group (fiscal 1985 through fiscal 1994)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.93	1.85	1.85
A	0.32	0.64	0.64	0.64	0.96	1.27	2.23	2.23	2.87	4.46
BBB	0.33	0.52	1.11	1.51	2.03	2.62	3.15	3.74	4.91	7.14
BB or lower	4.92	7.81	9.11	10.70	12.01	13.16	14.61	16.30	18.76	21.36

1984 group (fiscal 1984 through fiscal 1993)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	2.00
A	0.31	0.63	0.63	0.94	0.94	1.56	1.88	3.13	3.44	4.38
BBB	0.58	1.16	1.48	2.44	3.02	3.53	4.11	4.62	5.07	6.29
BB or lower	5.09	9.55	11.12	12.12	13.59	14.64	15.84	17.21	19.10	21.14

1983 group (fiscal 1983 through fiscal 1992)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	1.09
A	0.30	0.60	0.89	0.89	1.19	1.19	1.79	2.08	2.98	3.27
BBB	0.74	1.35	2.09	2.43	3.37	3.91	4.45	4.99	5.46	5.93
BB or lower	5.45	10.68	14.00	15.60	16.61	17.90	18.86	19.93	21.21	22.92

1982 group (fiscal 1982 through fiscal 1991)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85
A	0.36	0.71	1.07	1.43	1.43	1.79	1.79	2.50	2.86	3.93
BBB	0.47	1.02	1.64	2.34	2.66	3.67	4.06	4.45	5.00	5.55
BB or lower	5.00	9.79	13.20	16.17	17.56	18.55	19.68	20.72	21.71	22.85

1981 group (fiscal 1981 through fiscal 1990)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
A	0.38	0.77	1.15	1.15	1.15	1.15	1.54	1.54	2.31	2.69
BBB	0.54	1.08	1.43	2.42	3.32	3.49	4.57	4.93	5.38	5.73
BB or lower	3.50	8.16	11.66	14.65	17.35	18.61	19.54	20.57	21.36	22.43

1980 group (fiscal 1980 through fiscal 1989)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
A	0.00	0.73	1.09	1.46	1.46	1.46	1.82	2.55	2.55	3.28
BBB	0.24	1.08	1.68	2.76	3.97	4.57	4.69	5.77	6.13	6.73
BB or lower	2.65	6.38	9.48	12.53	15.14	17.57	18.55	19.36	20.22	20.80



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1979 group (fiscal 1979 through fiscal 1988)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
A	0.00	0.00	1.15	1.54	1.92	1.92	1.92	1.92	2.31	2.31
BBB	0.26	0.39	1.43	2.47	3.78	4.95	5.47	5.73	7.03	7.29
BB or lower	3.42	5.79	8.20	11.05	13.77	16.14	18.29	19.12	19.91	20.66

1978 group (fiscal 1978 through fiscal 1987)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A	0.00	0.00	0.00	0.91	0.91	1.36	1.36	1.36	1.36	1.36
BBB	0.34	0.80	1.14	2.05	2.97	3.88	5.14	5.94	6.16	7.42
BB or lower	6.76	9.81	10.80	13.07	15.58	18.20	20.12	22.19	22.93	23.72

1977 group (fiscal 1977 through fiscal 1986)

Years elapsed	1	2	3	4	5	6	7	8	9	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A	0.00	0.00	0.00	0.00	1.57	1.57	1.97	2.76	2.76	2.76
BBB	0.86	1.48	2.35	2.59	3.46	4.32	5.19	6.30	7.16	7.41
BB or lower	9.08	15.18	16.96	17.76	19.69	21.58	23.46	24.80	26.44	27.03