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Credit ratings and the BIS capital adequacy reform agenda ☆

Edward I. Altman *, Sreedhar T. Bharath [1], Anthony Saunders [2]

Stern School of Business, Salomon Center, New York University, 44 West 4th Street, New York, NY 10012-0267, USA

Abstract

In this paper, we have revised and updated our earlier study in order to analyze the most recent (second) draft of the BIS's proposed reforms of bank capital requirements. We conduct Monte-Carlo experiments using data on defaults and severity rates on publicly-traded US corporate bonds over the 1981–1999 period. Analyzing the whole period and various sub-periods, it is clear that the most recent draft of the BIS proposed reforms seriously overestimates the relative riskiness of high-quality debt relative to low quality debt in the so-called standardized model. As a result, the most recent proposal still contains inherent risk-shifting (taking) incentives for banks. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

In earlier papers, Altman and Saunders (2000, 2001) analyzed the initial reform proposals of the BIS released in June 1999 (Basel Committee on Banking Supervision, 1999). The initial BIS proposals put forward a three-stage plan towards reforming the

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* Corresponding author. Tel.: +1-212-998-0709; fax: +1-212-995-4220.
E-mail addresses: ealtman@stern.nyu.edu (E.I. Altman), sbharath@stern.nyu.edu (S.T. Bharath), asaunder@stern.nyu.edu (A. Saunders).
[1] Tel.: +1-212-998-0300.
[2] Tel.: +1-212-998-0711.

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current 8% risk-based capital rule for credit assets of banks. Specifically, a first stage standardized model, with risk-weights based on credit rating agency buckets, was envisaged to be followed by the adoption of internal rating based (IRB) models (using bank's own risk weighting/grading systems) and potentially, in the future, transition to internal models based on (default) correlations among credit risky assets.

In our earlier paper, we found fault with two aspects of the then proposed standardized model. The first was the inherently lagging nature of agency ratings that could result in capital ratios moving too slowly in cyclical recessions e.g., required capital ratios reaching a peak *after* a recession, when loan default increases had already occurred. The second problem involved the broad degree of granularity in the corporate loan risk weightings in that only three buckets for rated *corporate* loans were envisaged with one additional bucket for unrated loans. We showed that the proposed relative risk weightings of 20% (AAA to AA−), 100% (A+ to B−) and 150% (below B−), along with the 100% for unrated borrowers, were simply too broad and did not reflect the relative risk of unexpected losses on loans in each bucket. In order to show this, we utilized data on corporate bond defaults (including prices one year prior to default as well as on default) in the US over the period 1981–1999 (September).

These data, along with different assumptions regarding the shape of loss distributions on loans (bonds), including the normal, actual and Poisson distributions as well as using Monte-Carlo experiments, [3] showed that the proposed BIS corporate loan risk weights did not differentiate sufficiently with respect to both the expected and unexpected loss rates in these buckets. Based on these findings, we recommended a revised weighting scheme that included splitting the A+ to B− 100% bucket, into two separate buckets, A+ to BBB− and BB+ to B−, with the split reflecting the division between investment and non-investment grade borrowers. Our proposed risk weightings on the revised investment and non-investment grade buckets are listed in Table 1. The rationale for the lower 10% weight for AAA to AA− rated corporate credits was the observation that there has never been a default, within one year, on bonds rated in these two top categories and our updated results (below), continue to show this. We agree, however, that in some unusual cases, a AAA or AA bond could default over a one year horizon. [4] As such, we believe a non-zero risk-weight is pru-

Table 1
An alternative risk weighting proposal for bank corporate loans[a]

	AAA to AA−	A+ to BBB−	BB+ to B−	Below B−
Corporates	10%	30%	100%	150%

[a] From Altman and Saunders (2000, 2001).

[3] See, Saunders (1999) for a description of alternative loss distribution models.

[4] For example, Southern California Edison's and Pacific G&E's bonds were rated AA− as of December 31, 2000 and there is, at the time of this writing, a non-trivial probability that the firm could default sometime in the year 2001 due to the regulatory debacle and the sudden increase in fuel cost and lack of energy in California. Indeed, Pacific G&E's AA-bonds, as of December 31, 2000, did default less than one month later in mid-January, 2001.

Table 2
Proposed BIS standardized model for corporate loans, January 2001

Credit assessment	AAA to AA−	A+ to A−	BBB+ to BB−	Below BB−	Unrated
Risk weights	20%	50%	100%	150%	100%

Source: Basel Committee on Banking Supervision, 2001.

dent, but are not convinced that the 20% weight in the 1999 BIS proposal, and in their new draft, is appropriate. We still prefer the lower 10% owing to the empirical evidence to date.

We also found that the ratio of unexpected losses between investment grade A+ to BBB− bonds, versus non-investment grade BB+ to B− bonds, was roughly between 3 and 5 times greater for the latter. We therefore specified a 30% and 100% weighting for the two new buckets, respectively. Also, recognizing that below B− bonds were far more riskier than those at B or above, we selected a 150% weight, although we felt that this was too low. Finally, we explored the total elimination of the unrated class and its attendant 100% weight and suggested that wherever possible, internal credit ratings be utilized. We continue to strongly suggest this approach, especially since the subsequent BIS documents of January 2000 and January 2001 (BIS II) (Basel Committee on Banking Supervision, 2000, 2001), emphasize the eventual need for IRB systems for all banks. We cannot see any economic or statistical rationale for clinging to an unrated class with risk-weights that are lower than some of the rated categories.

In the newly amended proposal, released in January 2001, the BIS now proposes a revised standardized model in which an additional bucket is added for corporate loans, see Table 2. Moreover, stage two is replaced by two alternative IRB schemes; one called the "foundations" approach, the other the "advanced" approach. The "foundations" scheme requires a default probability (PD) to be calculated for each rating grade from a bank's (granular) rating system, based in part on the historical default experience of the bank. This PD number is then adjusted to reflect both the expected and unexpected probabilities of default, and multiplied by a *standardized* loss given default (LGD) factor and adjusted by a maturity (M) factor so as to calculate a benchmark risk weight (BRW). The principal difference between the "foundations" and "advanced" approaches is in the bank's internal calculation of LGD, and M, as well as the exposure at default (EAD) in the latter approach. [5,6]

In Section 2 of this paper, we conduct a revised empirical analysis of the new proposed standardized bucket weights using the same period data (1981–1999 September) used in our earlier study and employing Monte-Carlo simulation methods over various sample and sub-sample periods. In methodology, our paper is closest to that of Carey (1998), who used Monte-Carlo simulations to derive loss distribution for

[5] The IRB foundations and advanced approaches are calibrated to an average asset correlation of 0.20 for all loans.

[6] The final proposal is now slated for the end of 2002 with eventual (full) implementation in 2005.

private placements held as investments by major life insurance companies in the US. However, we have the advantage of looking at publicly traded bonds (in our paper) so that we can analyze the market's view as to the loss on default (severity) and thus adopt a (quasi) mark-to-market measure (MTM) of loss severity rather than using book-value accounting measures of losses as in most conventional default loss (or default mode (DM)) estimates. Specifically, we don't "assume" that the bond has a par value of 100 one year prior to default, rather we use its market price one year prior to default, as a benchmark to calculate loss severity at default.

2. Analysis of the BIS standardized model: Methodology and data

2.1. Standardized risk weights under BIS II

Table 2 shows the revised risk weights of the standardized model as proposed by the Basel Commission on bank supervision. The risk weight for AAA to AA− remains at 20%, even though we could find no corporate bond that had defaulted with such a rating over a one year horizon for the 1981–1999 (September period). The second original bucket of 100% for A+ to B− has been split into three, as we and others had recommended. However, the split chosen is A+ to A−, BBB+ to BB− and below BB−, rather than the more logical investment grade versus non-investment grade split of A+ to BBB−, BB+ to B− and below B−, that we suggested in our original article. The relative risk weightings of these three new buckets are 50%, 100%, and 150%. Note that the most risky "rated" bucket starts at below BB− whereas under the original proposal it started at below B−. It should also be noted that unrated corporate borrowers remain with a 100% risk weight, as under the original proposal.

The revised BIS buckets, under BIS II, therefore, combine the dominant "junk bond" rating (single B) with the lowest and far less common rating, (CCC or Caa), and weight this bucket at 150%. This combination is somewhat odd since all the empirical evidence that we have seen (see later) shows that the PD of a triple C bond is much greater, than a single B issue. [7] We can find no *a priori* rationale for the revised bucket weights other than they are less granular than the original proposal's and that the Commission is responding positively toward the many commentators who advocated increasing the number of buckets for corporate loans.

2.1.1. Methodology and data

In order to evaluate the relative accuracy of the standardized model's "risk weights" under the new BIS scheme, we use data on US corporate bond defaults and loss severities over the 1981–1999 period to generate loss distributions and to calculate the expected (mean) and unexpected loss rates (at various percentiles, i.e., 95%, 97.5%, 99%, 99.5%, 99.9% and 99.95%). The BIS explicitly interprets cap-

[7] See also (Caouette et al., 1998, Chapter 15) who compare S&P, Moody's and Altman's one year and cumulative default rates.

ital as that equity being sufficient to withstand both expected and unexpected losses. [8] The justification for including expected losses in the capital calculation is that loan loss reserves and provisions (up to a maximum of 1.25%) are counted as Tier II Capital as part of the current BIS 8% minimum required capital ratio.

In the analysis that follows, we concentrate on the mean (expected) loss rate of each standardized category and the 99.5% loss rates. [9] In the Monte-Carlo experiments, discussed below, we follow a two-step procedure. First, we randomly select a year from the total sample (or sub-sample) period of interest and then (secondly) randomly select bonds from the year until the portfolio size of $1 billion is reached. [10] Such a portfolio size ($1 billion) might reflect a medium-sized US bank's loan portfolio – i.e., the type of bank that is more likely to adopt the proposed standardized model rather than either one of the more advanced IRB approaches. The two-step approach was adopted to preserve the correlation structure among bonds in the portfolio (i.e., a correlation structure that reflects systematic effects present across industries (bonds) in any given year). To analyze loss distributions, 50,000 portfolios are constructed using the two-step Monte-Carlo procedure. It should be noted that the simulation is conducted with replacement.

Fig. 1 shows the distribution, by broad rating category, of non-defaulted and defaulted issues over the 1981–1999 period. The number and distribution of non-defaulted issues is from Standard and Poor's, while the number of defaults and their severity are from the Altman database on bond losses and recoveries. Two issues need to be mentioned. First, we only have data on "broad" ratings rather than "narrow" ratings (i.e., there is no distinction by + or − notches) whereas the BIS standardized buckets are based on narrow ratings. Second, the BIS proposal relates primarily to loans and loans are normally viewed as generally more senior than bonds. As such, our bond loss estimates are likely to overestimate loan losses. However, since we use the price one year before default for calculating losses, the losses are likely to be understated relative to a book value loss measure of loans.

Fig. 2 shows the distribution of loss severities over the 1981–1999 period. As noted above we use market prices to calculate the severity of losses on default using a conventional one year credit risk horizon. Specifically, loss severity is calculated as the *absolute value* of the difference between the price of the bond on default minus

[8] Most analytical work has equated expected losses with loss provisions or reserves, with unexpected losses being insulated by bank capital.

[9] It might be noted that the BIS IRB benchmark weights are explicitly calibrated to the 99.5% level.

[10] In order to construct the portfolios for the Monte-Carlo simulations, we need the average size of a bond in the portfolio and its portfolio weight composition. We obtain average issue size for each credit rating from 1981 to 1999 by obtaining the list of all bond issues from the SDC platinum database. We follow Carey (1998) for the information on the composition of private debt portfolios and a typical US bank's commercial loan portfolio by credit rating class (the other portfolios considered in the simulations are exclusively from a single credit class). We adjust the average allocation of each bond in the portfolio as a percentage of the issue size for the constructed portfolios in order to obtain an overall portfolio size of $1 billion. This is reasonable since each bond in the portfolio has an allocation between $6 million and $13 million or about 4–10% of capital for a single exposure. This is consistent with the current regulatory constraint of 10% of capital for any individual credit exposure.

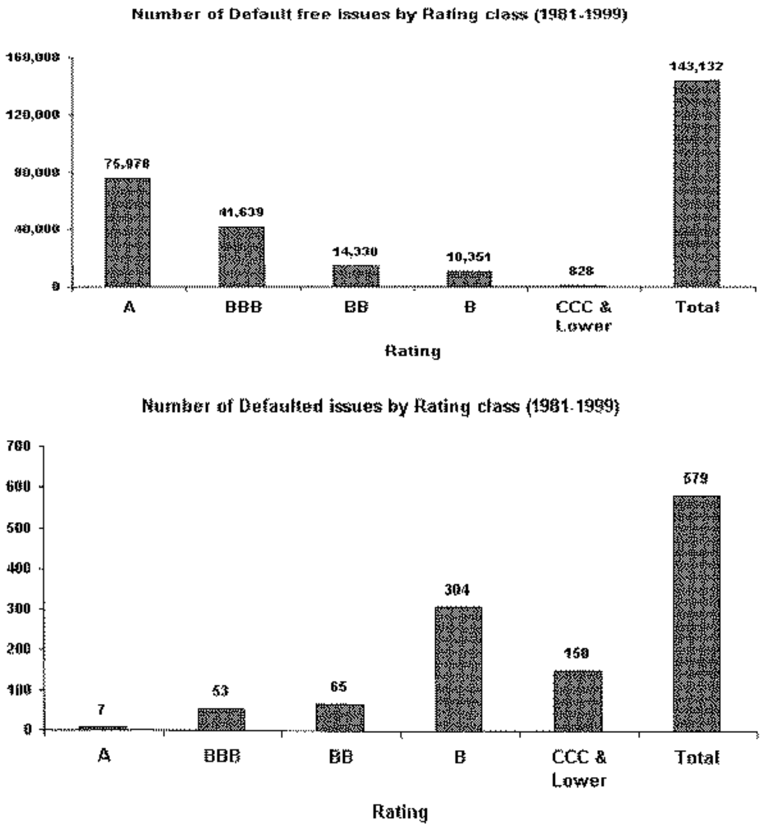

Fig. 1. This figure displays the number of default free issues and number of defaulted issues by credit rating class. Default free issues are obtained from S&P and defaulted issues from the Altman default database.

the price of the bond one year prior to default divided by the price of the bond one year prior to default. As such it is a market based measure of loss severity. As can be seen, the distribution shows a high variance and a negative skew.

Table 3 shows the distribution of loss severities by 10% buckets for A through CCC rated bonds. Note that there are no columns for AAA and AA loss severities, as no bonds in these categories migrated from AAA or AA to default within *one year* over our sample period 1981–1999. As can be seen, both the mean and standard deviation of losses rise sharply and *non*-linearly as the credit quality of bonds fall. For example, both BBB and BB bonds are combined in one BIS standardized bucket. Yet Table 3 shows the mean or expected loss rate on BB bonds is over four times larger than BBB bonds and its standard deviation (of loss rates) twice as high. Similarly B and CCC bonds are combined in one bucket but the mean and standard deviation of loss rates on CCC bonds are respectively over five times and two times higher.

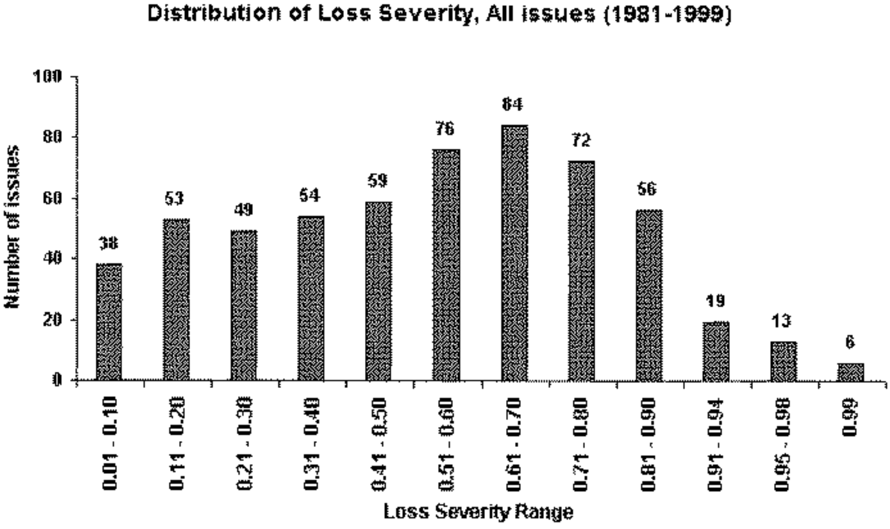

Fig. 2. This figure displays the number of defaults falling in each range of loss severity. Individual default loss severity is measured as the difference between the bond price at the time of default and price at one year before default divided by the price at the time of default in absolute value terms.

Table 3
Frequency distribution of losses (principal), (1981–1999) one year before default, by rating one year before default (based on number of issues)

Loss range	Mid-point	A	BBB	BB	B	CCC & lower	Total
0	0	75978	41639	14338	10351	826	143132
0.01–0.10	0.05	0	5	5	20	8	38
0.11–0.20	0.15	3	15	2	21	12	53
0.21–0.30	0.25	0	4	5	27	13	49
0.31–0.40	0.35	2	2	11	24	15	54
0.41–0.50	0.45	1	2	11	30	15	59
0.51–0.60	0.55	0	2	5	53	16	76
0.61–0.70	0.65	0	7	8	47	22	84
0.71–0.80	0.75	0	10	10	34	18	72
0.81–0.90	0.85	0	4	1	25	26	56
0.91–0.94	0.92	0	0	3	14	2	19
0.95–0.98	0.96	0	0	3	7	3	13
0.99	0.99	1	2	1	2	0	6
1	1	0	0	0	0	0	0
Total default		7	53	65	304	150	579
Total non-default		75978	41639	14338	10351	826	143132
Total		75985	41692	14403	10655	976	143711
Mean (PD $\times$ LGD) (%)		0.003	0.057	0.233	1.509	8.286	0.210
PD (%)		0.009	0.127	0.451	2.853	15.369	0.403
LGD (%)		37.000	44.585	51.585	52.905	53.913	52.064
St.Dev (%)		0.444	1.914	3.854	9.791	21.904	3.690

Table 4
Yearwise frequency distribution of losses (principal) (1981–1999), by rating one year before default (based on number of issues)

Year	A	BBB	BB	B	CCC & lower	Total
1981	0	0	0	0	0	0
1982	2	0	6	6	4	18
1983	0	0	1	2	1	4
1984	0	3	0	5	3	11
1985	0	0	1	18	7	26
1986	1	0	13	21	14	49
1987	0	1	0	16	10	27
1988	0	5	6	29	18	58
1989	0	10	2	16	10	38
1990	1	2	4	47	30	84
1991	0	23	13	46	25	107
1992	0	0	13	9	6	28
1993	0	0	0	3	3	6
1994	0	0	0	7	2	9
1995	3	1	1	18	2	25
1996	0	0	1	9	7	17
1997	0	0	1	3	5	9
1998	0	0	1	15	2	18
1999	0	8	2	34	1	45
Total	7	53	65	304	150	579

Table 4 shows the distribution of defaults by year. As found by Carey (1998) for US private placements at life insurance companies, there is a considerable clustering of defaults in and around recessions. Thus the largest number of defaults on US corporate bonds occurred during 1991, at the trough of the last US recession. Interestingly, defaults in 1999 were 45, higher than in any other years in the 1990s apart from 1990 to 1991.

3. Empirical results

Table 5 reports the results of our two-step Monte-Carlo simulation approach on a variety of portfolios using the whole 1981–1999 period. The first two portfolios; 13% below BBB and 50% below BBB, reflect typical credit quality structures of respectively US life insurance companies and US banks as identified by Carey (1998) in his analysis of losses on private placements. The 13% (50%) limits constrain the maximum (number) of bonds of below investment grade quality that can be included in constructing the \$1 billion portfolios in the second stage of the Monte-Carlo simulations. For the next five portfolios in Table 5 (A, BBB, BB, B, CCC and lower), we conduct Monte-Carlo simulations using the two-step procedure constrained to a single broad credit rating class. Finally, the last three portfolios reflect "broad" rating approximations to the standardized buckets proposed under the BIS II proposals of

Table 5
Loss rate distribution for portfolios (1981–1999)

	Size ($ billions)	Simulated loss rates (%), at loss distribution percentiles						
		Mean	95.0	97.5	99.0	99.5	99.9	99.95
Portfolio characteristics								
13% below BBB	1.00	0.129	0.639	0.895	1.158	1.374	1.880	2.068
50% below BBB	1.00	0.458	1.840	2.287	2.829	3.254	4.104	4.599
A	1.00	0.010	0.000	0.000	0.000	0.350	0.990	0.990
BBB	1.00	0.064	0.650	0.800	1.050	1.400	1.950	2.050
BB	1.00	0.302	1.550	2.060	2.700	3.160	4.110	4.550
B	1.00	1.443	5.220	6.370	7.600	8.320	9.740	10.180
CCC &lower	1.00	7.409	23.700	26.200	28.530	30.000	32.850	33.900
BIS buckets								
A	1.00	0.010	0.000	0.000	0.000	0.350	0.990	0.990
BBB & BB	1.00	0.125	0.800	1.010	1.500	1.710	2.370	2.700
Below BB	1.00	2.010	7.200	8.650	10.100	11.030	12.800	13.340

This table reports Monte-Carlo estimates of portfolio loss rates at the mean and various percentiles of the credit loss rate distribution, conditional on simulated portfolio size and composition $1 billion indicates portfolios were $1 billion in size. Results in each row are based on 50,000 simulated portfolios. The typical private placement portfolio has 13% of assets rated <BBB, the typical large US commercial bank business loan portfolio has 50% of assets rated <BBB.
Note: AAA/AA bucket has no defaults.

January 2001. Note that we only include three of the four buckets since no defaults occurred for bonds in the AAA and AA bucket over our sample period.

In what follows below, we concentrate on the Monte-Carlo simulation results for the BIS buckets and the 99.5% loss rate, since this seems to be the chosen capital target for the BIS capital adequacy standards (see Basel Committee on Banking Supervision, 2001).

Since the numbers in Table 5 can be interpreted as loss rates at certain percentile levels, and thus by implication capital required to meet credit asset losses, these figures can usefully be compared to the BIS II proposed standardized risk weights (see Table 2) and the capital requirements they imply. Thus the standardized risk weight for A grade credits of $50\% \times 8\% = 4\%$ capital requirement. While the risk weights of respectively 100% for BBB/BB and 150% for below BB credits can be translated into capital requirements of 8% and 12%. [11]

As can be seen from Table 5, for the whole sample period the capital requirements under the BIS II standardized proposal are *far too high*, especially for the A (0.35% versus 4%) and BBB/BB (1.7% versus 8%) buckets. Interestingly, the simulated capital requirement under the Monte-Carlo experiment for the below BB bucket of 11% is very close to the proposed 12% under the standardized model.

[11] That is $100\% \times 8\% = 8\%$ and $150\% \times 8\% = 12\%$ where 8% is the current risk-based capital ratio minimum. Although the original 8% ratio reportedly had a built in margin for operation risk as well as credit risk. Consequently, these figures can be viewed as upper-bound measures of minimum capital requirements for credit risk.

Table 5 however, combines periods of expansion and contraction (recession). To the extent that capital is an insulating device against banking system failure, the adequacy of the proposed standards need to be assessed in periods when the banking system is likely to be weakest, i.e., in recessions.

In Table 6, the sample period is broken into three sub-sample periods: 1981–1988, 1989–1991, and 1992–1999. The same two-step Monte-Carlo simulation exercise is conducted with the added constraint that the years randomly selected fall within their respective sub-samples.

The discussion that follows concentrates on the 1989–1991 recession years. First, it can be seen, comparing figures in the 99.5% column, that losses were much higher (in most cases more than twice as high) in the recession sub-period than either of the non-recession periods for rating classes of bonds (1981–1988 or 1992–1999) for all classes of bonds. Second, the recession period losses experienced for the A bucket (0.99%) and BBB/BB bucket (2.3%) are nevertheless low compared to the proposed capital for these buckets of respectively 4% and 8%. For the most risky below BB bucket, the capital ratio for that bucket, (13.1%) is slightly higher than the proposed 12%.

Overall, the Monte-Carlo simulations suggest significant over-pricing for the three least risky buckets (broadly defined) i.e., AAA/AA, A and BBB/BB with relatively accurate "pricing" of risk for the most risky bucket (below BB). Thus, while risk-sensitive weightings is clearly an improvement over non-risk sensitive weighting, as under the current BIS I plan, there will still be a strong incentive for banks using the standardized model to risk-shift out of the least risky asset quality classes.

Finally, what about the unrated bucket in the standardized model? The unrated bucket with its controversial 100% risk weight remains an unfortunate vestige from the 1988 accord. We can find no economic or statistical rationale for the weighting in this category and since the vast majority of credits in the world's banking systems are not rated by rating agencies, this category could dominate the overall required capital held by many small and medium-sized banks.

Data for comparing loss rates on unrated bonds, or loans, is almost impossible to get since the "class" is fairly ambiguous and probably encompasses securities of very different quality. Nevertheless, Fig. 3 does show that non-rated (NR) *institutional loans* issued by publicly owned companies in the United States had a cumulative default rate over the 1996–2000 (Q3) period that was higher than BB but lower than B rated loans. This suggests a rating somewhat between 100% and 150% under the revised standardized model rather than the proposed 100%. Also, the default rate was higher than the average leveraged loan. (Leveraged loans are classified as non-investment grade if their yield is 150 basis points over LIBOR.) These data are important and relevant since there were a significant number of NR loans (276) compared to all leveraged loans issued (542) in the five year period 1995–1999. It should be pointed out that these data are related to the expected probability of default and not expected or unexpected losses. The data is also for a relatively short period of time and probably will become scarcer as an increasing proportion of larger loans become rated.

Table 6
Loss rate distribution for portfolios (1981–1988, 1989–1991, 1992–1999)

	Size ($ billions)	Simulated loss rates (%), at loss distibution percentiles						
		Mean	95.0	97.5	99.0	99.5	99.9	99.95
Data: 1981–1988								
Portfolio characteristics								
13% below BBB	1.00	0.122	0.589	0.806	1.049	1.243	1.614	1.749
50% below BBB	1.00	0.449	1.715	2.105	2.557	2.884	3.575	3.837
A	1.00	0.004	0.000	0.000	0.150	0.350	0.350	0.350
BBB	1.00	0.046	0.450	0.750	0.850	1.300	1.600	2.050
BB	1.00	0.332	1.600	2.050	2.520	2.850	3.550	3.850
B	1.00	1.135	3.650	4.200	4.850	5.300	6.300	6.750
CCC & lower	1.00	7.892	22.500	24.350	26.200	27.500	29.600	30.350
BIS buckets								
A	1.00	0.004	0.000	0.000	0.150	0.350	0.350	0.350
BBB & BB	1.00	0.121	0.750	0.960	1.400	1.560	2.150	2.350
Below BB	1.00	1.732	4.850	5.600	6.350	6.880	8.050	8.400
Data: 1989–1991								
Portfolio characteristics								
13% below BBB	1.00	0.330	1.132	1.364	1.655	1.850	2.319	2.553
50% below BBB	1.00	1.123	2.832	3.243	3.734	4.087	4.857	5.149
A	1.00	0.012	0.000	0.000	0.990	0.990	0.990	0.990
BBB	1.00	0.248	1.000	1.300	1.600	1.980	2.250	2.500
BB	1.00	0.729	2.600	3.160	3.790	4.200	5.080	5.520
B	1.00	3.844	7.870	8.600	9.420	10.020	11.370	11.870
CCC & lower	1.00	16.374	28.940	30.300	31.930	33.130	35.240	36.010
BIS buckets								
A	1.00	0.012	0.000	0.000	0.990	0.990	0.990	0.990
BBB & BB	1.00	0.361	1.400	1.710	2.030	2.320	2.820	3.140
Below BB	1.00	5.439	10.460	11.320	12.300	13.100	14.640	15.170
Data: 1992–1999								
Portfolio characteristics								
13% below BBB	1.00	0.06	0.472	0.544	0.632	0.824	1.049	1.181
50% below BBB	1.00	0.22	0.949	1.127	1.416	1.630	2.037	2.199
A	1.00	0.002	0.000	0.000	0.000	0.150	0.450	0.450
BBB	1.00	0.018	0.000	0.000	0.750	0.850	1.500	1.600
BB	1.00	0.118	0.900	1.100	1.450	1.700	2.150	2.400
B	1.00	0.853	2.600	3.100	3.750	4.170	5.020	5.340
CCC & lower	1.00	3.502	7.450	8.250	9.200	9.750	11.050	11.500
BIS buckets								
A	1.00	0.002	0.000	0.000	0.000	0.150	0.450	0.450
BBB & BB	1.00	0.042	0.450	0.650	0.850	0.920	1.400	1.600
Below BB	1.00	1.064	2.770	3.250	3.790	4.200	4.920	5.220

This table reports Monte-Carlo estimates of portfolio loss rates at the mean and various percentiles of the credit loss rate distribution, conditional on simulated portfolio size and composition. $1 billion indicates portfolios were $1 billion in size. Results in each row are based on 50,000 simulated portfolios. The typical private placement portfolio has 13% of assets rated <BBB, the typical large US commercial bank business loan portfolio has 50% of assets rated <BBB.
Note: AAA/AA bucket has no defaults.

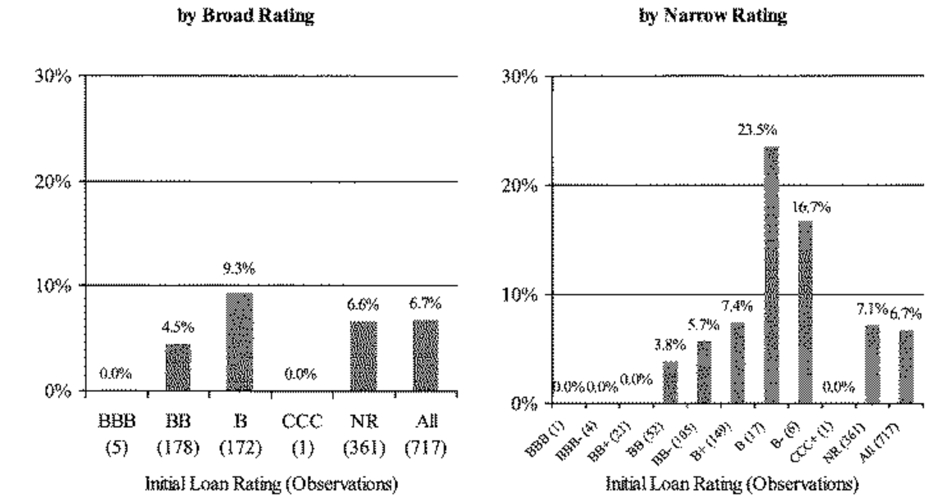

Fig. 3. Cumulative institutional loan defaults rate by initial S&P loan rating comprises institutional loans closed between 1995 and 15 February 2001 for issuers that file publicly.
Source: PMD/S&P (Miller, 2001). Statistics, 2001, updated from Van den Castle and Keisman (1999).

4. Summary and conclusion

This paper has analyzed the revised risk weights and capital requirements for credit risk under the standardized model proposed by the BIS in January 2001. While the risk-weighting of lower quality loans are higher than for better quality loans, the proposal still "over-prices" the risk of the three highest quality buckets in the standardized model. In particular, even in a recessionary period such as 1989–1991, the capital requirement for the AAA/AA, A and BBB/BB buckets might be something closer to 0%, 1% and 2.5% rather than the proposed 1.6%, 4%, and 8%. By contrast the 12% capital ratio proposed for the below BB category appears to be about right even in a recessionary period similar to 1989–1991. It might also be noted that our analysis is for corporate bonds, which because of their lower seniority than loans normally have higher loss severities. Finally, offsetting this effect is the fact that the BIS has claimed to be using a CreditMetrics type approach that accounts for credit migrations as well as defaults (a so-called MTM approach). To the extent that most credit quality migrations of high rated assets are likely to be in the downward direction, higher capital ratios than those generated under pure DM scenarios (even with MTM calculated severities) can be justified.

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