DEFAULT RATES OF Canadian Corporate BOND ISSUERS

Fourteen years of empirical data help draw the lines between debt ratings and defaults.

BY DAVID T. HAMILTON AND SHARON OU

Credit ratings are vital inputs for structured finance investments and bond portfolio selection and governance (such as CDOs), as well as important potential benchmarks for determining risk-based capital requirements. Rating agency default studies, as well as a large body of academic research, have documented the strong correlation between corporate credit ratings and the risk of default. However, the historical default rates reported in those studies are overwhelmingly influenced by the experience of U.S.-domiciled corporate bond issuers. Investors seeking to diversify their portfolios by taking on exposures to different geographical markets require region- or country-specific estimates of default risk.

In this study, we document the historical default experience of Moody's-rated Canadian-domiciled corporate bond issuers from 1989 to 2003. Throughout this report we compare and contrast the experience of Canadian corporate bond issuers with U.S.-domiciled issuers. The U.S. experience is a natural benchmark because of its long history, for which extensive data is available, and also because Canada and the U.S. share close economic ties.

Data & Methodology

The primary dataset we use in this study derived from Moody's proprietary database of credit ratings and defaults for industrial, transportation, utilities, and financial institutions that have issued long-term debt to the public. Municipal and sovereign debt issuers, structured finance transactions, private placements and issuers with only short-term debt ratings are excluded from the sample. Between 1989 and 2003, Moody's rated a total of 335 Canadian corporate bond issuers. While we primarily rely on Moody's credit rating data in this study, we do not believe that the results are materially biased for issuers that sought credit ratings during the sample period under study. Whether self-selection by Canadian corporate issuers who obtain credit ratings leads to biased estimates of default risk for the Canadian corporate debt market as a whole is a topic beyond the scope of this report.

For the purposes of this study, a corporate issuer is considered to be domiciled in Canada if it is legally incorporated or has the majority of its operations and assets in Canada. Debt may have been placed in multiple markets and in currencies other than Canadian dollars. In addition to bankruptcy under the Companies' Creditors Arrangement Act, events of default may have occurred under foreign legal frameworks (such as U.S. Chapter 11).

The default rates we report herein are the frequency of issuer defaults rather than the frequency of bond issue or dollar volume defaults. The latter calculations would bias default rates toward issuers that have numerous or large debt issues outstanding, and would therefore be biased estimates of the historical likelihood of default.

Growth of the Rated Corporate Sector

Since 1989, the total number of Moody's-rated corporate bond issuers has grown at an 11% annualized rate. During this period, the number of investment-grade issuers grew at an 8% annualized rate, while issuers

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EXHIBIT 1

OUTSTANDING MOODY'S-RATED CANADIAN CORPORATE ISSUERS, ANNUALLY 1989-2003

Rating	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Aaa	6	7	8	4	4	5	2	2	2	2	2	4	4	5	8
Aa	18	23	25	22	22	18	21	24	24	24	28	26	27	30	28
A	14	15	13	22	19	21	22	24	31	36	34	40	44	47	48
Baa	7	6	8	5	11	14	16	23	25	34	40	43	41	53	38
Ba	1	1	1	6	10	9	8	19	22	17	22	24	23	21	28
B	3	1	0	2	0	8	18	21	24	35	34	32	29	27	25
Caa-C*	0	0	0	0	0	0	1	1	3	8	12	15	9	9	6

* Excludes Caa-C-rated issuers in default.

with speculative-grade ratings showed an extremely high rate of growth, rising at a 23% annualized rate. Exhibit 1 shows the growth of Moody's-rated Canadian bond issuers.

Accompanying the rise in speculative-grade rated issuers was a fall in the proportion of issuers carrying the highest (Aaa) credit ratings within the investment-grade part of the ratings scale. Until the mid-1990s, many Canadian portfolio managers (and their portfolio governance guidelines) considered the *de facto* investment-grade/speculative-grade boundary to be A3 rather Baa3. As government crowding out eased in the mid-1990s, portfolio managers began to look down the curve for yield. This led to a growth in Baa credits and, to a lesser extent, in speculative-grade issues as well. In addition, most of the Canadian issuers that Moody's rated in 1989 were large, cross-border issuers who were of relatively high credit quality. The opening up of the capital markets in Canada to smaller issuers, some in developing industrial sectors (such as technology and telecommunications), helped fuel growth in sub-investment-grade ratings.

As the distribution of ratings has changed over the last decade, the industry sector profile has changed as well. In 1989, 45% of Moody's-rated Canadian issuers were banks and financial institutions. Utility and energy issuers accounted for another 27%. The average rating of these issuers was between A1 and A2. Thirteen years later, the rated pool has diversified and grown, encompassing issuers from a broader cross section of industries.

Defaults and Default Rates

Between 1989 and 2003, a total of 61 Canadian issuers defaulted on $31 billion of bonds. Thirty-three of the defaulting issuers, representing $28 bil-

lion of defaulted bonds, were rated by Moody's and S&P within a year of the default date. An additional five were rated by Moody's alone, and two by S&P alone. Ten defaulting issuers had bonds outstanding that totaled over $1 billion each. The largest Canadian defaulter was AT&T Canada, which defaulted on over $4.6 billions of bonds in September 2002.

Following the global decline in credit quality, rated defaults in Canada have increased markedly in recent years. Between 1989 and 1999, there were no more than three defaults per year. During 2000-2002, when credit risk was increasing rapidly globally, default counts and default volume both hit record highs in Canada. Exhibit 2 summarizes default counts for rated and unrated issuers and total volumes annually since 1989.

Among the 61 total defaults, bond issuers in the

EXHIBIT 2

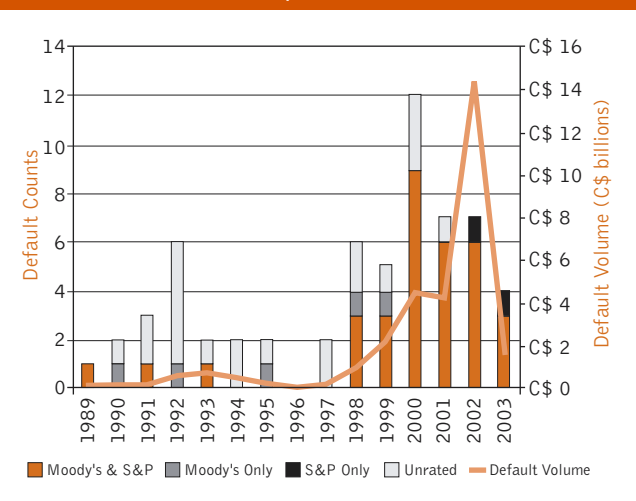## CANADIAN CORPORATE DEFAULT COUNTS AND VOLUME TOTALS, 1989-2003

EXHIBIT 3

Canada	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Aaa	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
Aa	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
A	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
Baa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	4.0	0.0
Ba	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	4.7	0.0	0.0	0.0	0.0
B	40.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	7.1	0.0	4.4
Caa-C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4	53.3	44.4	50.0	0.0
Investment-Grade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	1.6	0.0
Speculative-Grade	33.3	50.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	3.4	4.6	11.6	10.0	7.7	1.8
All Corporate	2.1	1.9	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.3	1.8	5.0	3.5	3.4	0.6

United States	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Aaa	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
Aa	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
A	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	0.3	0.0
Baa	0.6	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.3	1.1	0.0
Ba	2.8	3.2	5.4	0.3	0.6	0.3	0.6	0.0	0.2	0.5	1.0	1.1	1.6	1.2	1.2
B	8.5	16.0	14.5	9.3	5.9	4.1	5.2	1.5	2.4	4.5	6.0	6.7	9.2	4.8	2.4
Caa-C	25.0	58.8	36.8	26.7	28.6	2.7	12.0	14.6	11.9	16.5	20.5	19.5	34.0	23.9	20.8
Investment-Grade	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.6	0.0
Speculative-Grade	5.5	10.0	10.4	5.1	3.8	2.1	3.6	1.9	2.2	3.9	5.8	7.1	11.1	7.3	5.4
All Corporate	2.4	4.2	4.0	1.7	1.3	0.7	1.4	0.7	0.8	1.6	2.6	3.2	4.8	3.2	2.2

industrial sector accounted for almost 40%. Most of these were in the metals and mining, and forest products and paper sectors, which experienced 10 and six defaults, respectively. The telecommunications and technology sector was the second largest defaulting industry sector, accounting for 17% of defaults, slightly higher than the 11% share from the financial sector. Although there were only nine defaults by bond issuers in the telecommunications sector between 1989 and 2002, it accounted for over 56% of the default total by volume. Indeed, seven of the 10 largest defaults in the past 14 years were from the telecommunications sector, each defaulting on over $850 million of bonds. Industrial defaulters, in contrast, only accounted for 15% of total Canadian-dollar default volume.

Annual Default Rates

Moody's default rates are fractions in which the numerator represents the number of issuers that defaulted in a particular time period and the denominator represents the number of issuers that could have defaulted over that time period. Exhibit 3 presents the time series of annual default rates by whole-letter rating for both Canadian and U.S.

Moody's-rated corporate bond issuers from 1989 to 2003. Over most of this time period, annual default rates for Canadian issuers were lower than those for the U.S., primarily reflecting the relatively low level of rated corporate bond issuance in Canada. However, as the rated corporate bond market in Canada began to grow, particularly in the late 1990s, the empirical default rates become more reliable statistics. The rise in default rates for Canadian corporate issuers over 1998-2002 mirrors that of the U.S. over the same time period. Though not perfectly synchronous, default rates for speculative-grade rated issuers peaked at nearly the same level as those in the U.S., hitting a high of 11.6% in 2000 compared to 11.1% in 2001 in the U.S. The unusually high speculative-grade default rates in 1989 and 1990 are due to the very small number of rated issuers outstanding in those years. Since 1989, only three Canadian corporate issuers held an investment-grade rating within a year of default.

Multi-Year Default Rates

While annual default rates are useful for measuring trends in aggregate credit quality, they are less useful to bond investors, who generally have longer investment

AVERAGE CUMULATIVE DEFAULT RATES BY WHOLE-LETTER RATING, 1989-2003 (%)

Canada	Year 1	Year 2	Year 3	Year 4	Year 5	United States	Year 1	Year 2	Year 3	Year 4	Year 5
Aaa	0.0	0.0	0.0	0.0	0.0	Aaa	0.0	0.0	0.0	0.0	0.0
Aa	0.0	0.0	0.0	0.0	0.0	Aa	0.0	0.0	0.0	0.0	0.1
A	0.0	0.0	0.0	0.0	0.0	A	0.0	0.1	0.3	0.4	0.5
Baa	0.8	1.8	3.0	3.5	4.2	Baa	0.2	0.7	1.1	1.7	2.2
Ba	1.0	2.2	5.3	8.2	10.7	Ba	1.4	4.0	6.8	8.9	10.9
B	2.8	9.1	13.9	19.3	24.6	B	6.4	14.3	22.5	27.4	32.8
Caa-C	29.5	49.6	64.0	79.7	85.5	Caa-C	22.0	34.8	44.9	53.4	59.8
Investment-Grade	0.3	0.5	0.9	1.0	1.2	Investment-Grade	0.1	0.3	0.5	0.7	1.0
Speculative-Grade	5.3	11.3	16.6	22.2	26.3	Speculative-Grade	5.9	12.0	17.4	21.7	25.4
All Corporates	1.8	3.7	5.5	7.1	8.2	All Corporates	2.4	4.9	7.0	8.6	9.9

horizons. Exhibit 4 presents multi-year, weighted average cumulative default rates for both Canada and the U.S. by whole-letter rating category. Each row of the table shows the cumulative default rate for a holding period of up to five years. For example, a portfolio of bonds of Canadian issuers rated Ba (and where maturities and calls are reinvested in bonds of Ba credit quality) held for five years has experienced a default rate of 10.7%.

Aggregate cumulative default rates for Canadian corporate issuers are generally similar to those for the U.S. over all investment horizons. The average default rate for all rated issuers increases from 1.8% at a one-year holding period to 8.2% at a five-year holding period; for the U.S. the one- and five-year default rates are 2.4% and 9.9%, respectively. Canadian default rates for investment-grade issuers are also generally lower for each rating category than those for the U.S. Notably, no issuers rated Aaa, Aa, or A have defaulted within five years of holding those ratings in Canada.

Another notable feature shown in Exhibit 4 is the relatively high rate of default for Caa-C-rated Canadian corporate issuers. The default rate for this rating category in year one is nearly 10 percentage points higher than that for the U.S., and grows to 86% by year five, 26 percentage points higher than the U.S. Caa-C default rate. Although the extremely high five-year default rate is no doubt due to the small sample size, issuers who subsequently defaulted were identified as high credit risks early on, and were assigned correspondingly low credit ratings. For the average defaulter, credit quality deterioration was reflected in credit rating downgrades that occurred well in advance of the default date. Exhibit 5 plots the median and average senior unsecured rating for defaulted Canadian and U.S. issuers up to three years before default (t=0).

The chart reveals that corporate issuers that subsequently defaulted held low speculative-grade ratings three years before default occurred. The median and average rating has been near B1 for both Canada and the U.S. three years prior to default. As the default date approaches, Canadian defaulters were downgraded earlier, so that one year prior to default the median rating for Canadian defaulters was Caa1 compared to B2 for U.S. defaulters. This pattern is largely an artifact of the time period available for study, during which aggregate credit quality deteriorated sharply, and the distribution of industry sectors rather than a stricter rating standard being applied to Canadian issuers.

MEDIAN AND AVERAGE RATING 36 TO ZERO MONTHS BEFORE DEFAULT
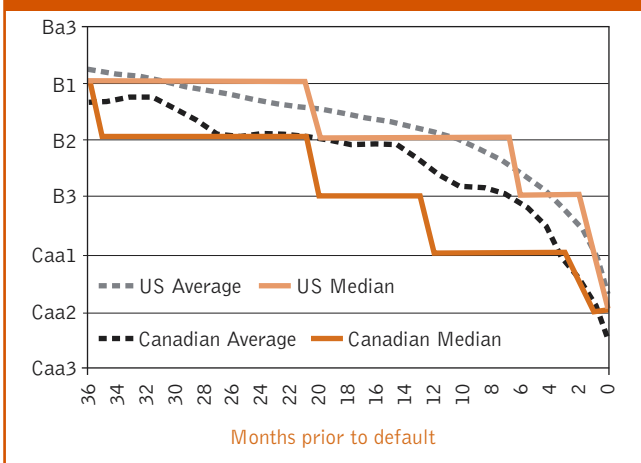
Default Severity and Credit Loss Rates

When a default occurs, investors usually recover some

portion of their contractual claim. For investors in default-risky debt, the expected recovery rate is as important a consideration as the likelihood of default. Exhibit 6 shows descriptive statistics for defaulted bond loss-severity rates (percent of par) in Canada and the U.S. for the 1989-2003 time period. The table shows that loss-severity rates in Canada are strongly correlated with the position of the lien: the higher the priority in the capital structure, the lower the severity rate.

The data in Exhibit 6 also show that mean severity rates in Canada have historically been higher than those in the U.S. at any given position in the capital structure. However, before concluding that defaulted bond recovery rates are systematically lower in Canada than in the U.S., we need to consider several mitigating facts. First, the sample size of our Canadian bond recovery data is small compared to the dataset for the U.S. We only have 95 observations for Canadian recovery, compared to a sample of 1,678 in the U.S. Secondly, telecommunications firms represent approximately 25% of the Canadian bond recovery data (by issue count). By comparison, they only account for 13% of the U.S. dataset. The low mean recovery rate for this sector (approximately 25% of par) further skews the Canadian averages. Lastly, the recovery data in the sample comes largely from the 1999-2002 time period, when default rates were cyclically high and recovery rates cyclically low.

Credit-loss rates give the loss of total return of a bond portfolio due to defaults. Exhibit 7 presents average one-year senior unsecured credit-loss rates for Canada and the U.S. Each row gives the annual percentage loss of total return of a bond portfolio with the given average credit rating. One-year credit loss rates for Baa- and Caa-C-rated issuers have been higher in Canada than in the U.S., while the opposite is true for Ba- and B-rated issuers. The third column of Exhibit 7 shows the Z statistic comparing the means. The Z statistics show that there is no significant difference in mean credit-loss rates at the Baa and Ba rating levels. The mean credit-loss rate at the Caa-C rating level is not significant at the 99% level; only in the B rating category do we find that credit losses in Canada are, statistically, significantly lower than in the U.S., but just barely so. The results suggest that credit-loss rates in Canada and the U.S. are quite similar by rating category.

EXHIBIT 6

MEAN DEFAULTED BOND LOSS-SEVERITY RATES, 1989-2003

Priority in Capital Structure	Canada			United States		
	Mean	StDev	N	Mean	StDev	N
Sr. Secured	54.4	33.7	11	45.4	27.7	171
Sr. Unsecured	64.2	22.7	4	59.6	28.6	780
Sr. Subordinated	71.8	32.7	70	69	24.0	420
Subordinated	85	11.0	10	73.4	21.0	307

EXHIBIT 7

MEAN ANNUAL SENIOR UNSECURED CREDIT LOSS RATES, 1989-2003

Rating	Canada	U.S.	Z
Aaa	0.00%	0.00%	-
Aa	0.00%	0.00%	-
A	0.00%	0.00%	-
Baa	0.51%	0.13%	-0.46
Ba	0.64%	0.90%	-1.08
B	1.80%	4.11%	-2.61**
Caa-C	18.95%	14.14%	-2.40*

* Significant at 95% level. ** Significant at 99% level.

Conclusion

Once dominated by highly-rated, investment-grade bond issuers, the Canadian corporate bond market has grown and diversified considerably in the past decade. In 1989, just 8% of Canadian corporate bond issuers were rated speculative-grade, whereas about 32% of the market is now rated speculative-grade. The rise in speculative-grade issuance has resulted in a notable increase in corporate defaults. Following the global trend, the annual Canadian corporate default rate for speculative-grade-rated issuers increased sharply in the late-1990s, peaking at 11.6% in the year 2000. On average, Canadian speculative-grade-rated issuers have defaulted at a 5.3% rate between 1989 and 2003, compared to an annual average rate of 5.9% for U.S.-domiciled speculative-grade-rated issuers. Finally, while average defaulted Canadian bond recovery rates are lower than those in the U.S., the data suggest that credit loss rates by rating category are generally the same across the two countries.

These findings have particular relevance for institutional bond investors and regulators. Effective portfolio diversification and asset allocation depend on estimates of default risk across rating categories and geographical

regions. Given the ratings' primacy in portfolio governance rules, and their proposed use in capital adequacy supervision, the findings contained herein suggest that credit ratings are sufficient statistics as far as geographical default risks are concerned. In addition, the statistics presented in this report demonstrate that the rating methodologies applied in Canada and the U.S. have resulted in default and credit loss rates that are roughly comparable between the two counties. ▌

References

Altman, E. I., "Defaults and returns on high yield bonds: analysis through 2001," *Journal of Applied Finance*, vol. 12, No. 1, Spring/Summer, 2002.

Brady, B. and D. Vazza, "Corporate defaults in 2003 recede from recent highs," Standard & Poors, January 2004.

Follis, R., "CBRS Study of Canadian Corporate Bond Defaults," Canadian Bond Rating Service (CBRS), September 1999.

Freedman, C. and W. Engert, "Financial developments in Canada: past trends and future challenges," Bank of Canada Review, Summer 2003.

Hamilton, D. T. and P. Varma, "Default and recovery rates of corporate bond issuers, 1920-2003," Moody's Global Credit Research, February 2004.

Kryzanowski, L. and J. Menard, "Migration behavior of long-term bond ratings of Canadian corporate bond issuers," *Canadian Investment Review*, Fall 2001.