



Credit Spreads and Default Risk

James Hymas

Why does a corporate bond yield more than a government bond? Many investors believe that this is due entirely to credit risk – the risk that the corporation will not be able to live up to its obligations and default on the agreed payments. In fact, Investopedia states flatly (at <http://www.investopedia.com/terms/c/creditspread.asp>) that “a company must offer a higher return on their bonds because their credit is worse than the government’s.”

Default risk is certainly important and should not be underestimated. It is the major reason why corporate bond investments have an asymmetric risk profile, that is, you can lose a lot more than you can win, unlike common stocks with which you can also lose all your money, certainly, but there is also a chance for unlimited winnings. However, in order to ensure that no opportunities for appropriate investments are missed, we should not overestimate the perils of default risk, either.

Consider, for example, the CU Inc. debenture maturing August 13, 2019, which pays a coupon of 6.80% and was recently priced at 114.29 to yield 4.99%, according to <http://www.pfin.ca/canadianfixedincome/Default.aspx>. At that time, a Government of Canada bond maturing June 1, 2019 was trading with a yield of 3.43%.

This is a massive difference. If the cash flows on the CU Inc. bond are discounted at the Canada rate (in other words, if the CU Inc. issue was trading to yield 3.43% with a spread to Canada of zero), the price of the bond would be \$128.71 – a significant increase from the actual price. To express this in another way, in order for the price of the CU Inc. issue to make sense at the Canada discounting rate, we must multiply each cash flow, both interest and principal by about 0.89, implying that expected losses (equal to the probability of default multiplied by the recovery after default) must exceed 11% before we would have been better off investing in the government bond.

Note, however, that this calculation is not internally consistent. Any shortfall in any coupon payment will trigger default. If we assume that all coupon payments are received in full, then we need only receive \$79.57 principal

payment on maturity instead of the expected \$100 to achieve a total return equivalent to the Canada issue. These calculations, however, assume that cash flows are calculated and discounted over an entire well-diversified portfolio. A more sophisticated calculation would perform a separate calculation for each potentially defaulting coupon and recognize that recovery on a default prior to maturity would be based on the par value of the bond, which in the case of this high-premium bond, would increase the loss expected by the investor. The simple calculations presented here are much more satisfying when performed on a bond trading at par! Note, however, the implication that high-coupon corporate bonds should trade at a higher yield than otherwise comparable low-coupon corporate bonds.

However, while CU Inc. is not as creditworthy as the government of Canada, it is a well-regarded company. DBRS rates its debt at A (high) while S&P assigns an A rating, granted when “the obligor’s capacity to meet its financial commitment on the obligation is strong.” Using Moody’s ten-year cumulative default probabilities and a recovery rate after default of fifty cents on the dollar, a conservative projection of rate of loss due to issuer bankruptcy is 1% of each cash flow.

When we apply this loss to each coupon (which implies a coupon rate of 6.73% and principal repayment of \$99 per \$100 face value) and calculate the discounting yield that results in the current price of \$114.29 plus accrued interest per \$100 face value, we find that the yield has become 4.85%, down from the actual yield of 4.99%, implying that 0.14% or 14bp (basis points) of the yield differential against governments is due to credit risk. Since the yield on governments of comparable term is 3.43%, this leaves 142bp unexplained.

To attempt to explain this differential, we remember that we have assigned a projected loss of 1% of each cash flow due to the potential for bankruptcy – a forecast that is necessarily subject to error. Bond defaults tend to occur in clusters (during times of poor overall economic conditions) and the frequency distribution tends to have a positive skew (our average figure of 1% will be comprised of many years

of slightly lower values, balanced by a small number of years with much higher values). To account for this uncertainty, we'll assume first that the appropriate benchmark for comparison is not the A rating class, but rather Moody's Baa class, and that the appropriate time period for estimation of default rate is actually 1929-38, the Great Depression. If we use these assumptions, we may estimate a probability of default of about 11%. If we retain the 50% recovery assumption, this results in a projected loss rate of 5.5%.

After applying this projected loss to the cash flows of the CU Inc. bond, we determine that the current price of \$114.29 plus accrued interest equates to a yield of 4.00%. Therefore, using these definitions of default risk (our best guess at default costs) and default uncertainty, which allows for severe economic conditions and errors in estimating credit quality, we may analyze the market yield as shown in Table 1.

Yield on risk-free bond	3.43%
Spread due to Default Risk	0.14%
Spread due to Default Risk Uncertainty	0.85%
Spread due to other factors	0.57%
Yield on CU Inc. debenture	4.99%
Spread components have been derived as explained in the text.	

As may be seen, our analysis has left a residual of 57bp due to "other factors". These factors may be thought of as representing the liquidity premium on the bond. Liquidity is a concept that many retail investors have difficulties understanding, having rarely been in a position of trying to buy or sell securities in quantities sufficient to move the market in a significant way. The gist of the matter is the ability to trade, say, \$50-million worth of bonds with one phone call. With a recently issued Canada bond ("on the run"), this is routine and does not move the market. With Canada bonds issued some time ago ("off the run"), this will be slightly more difficult. While with a corporate bond, you will be trading well away from the levels at which you could transact \$1 million, assuming you can find a counterparty who doesn't simply laugh at the very idea!

When you own a Canada bond, you are paying for the ability to make such large transactions (through your reduced yield) regardless of whether you have any ability or desire to do so.

A more homely example of the liquidity premium is the secondary market in department store gift cards. In secondary markets such as eBay, a gift card will trade at about 90% of its face value, even though it may be used immediately. Gift cards, however, are less liquid than cash, since they may be redeemed for useful goods only through the issuing retailer.

CHART 1

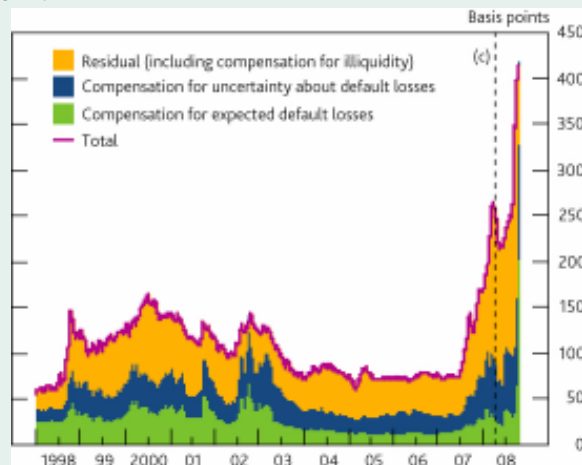
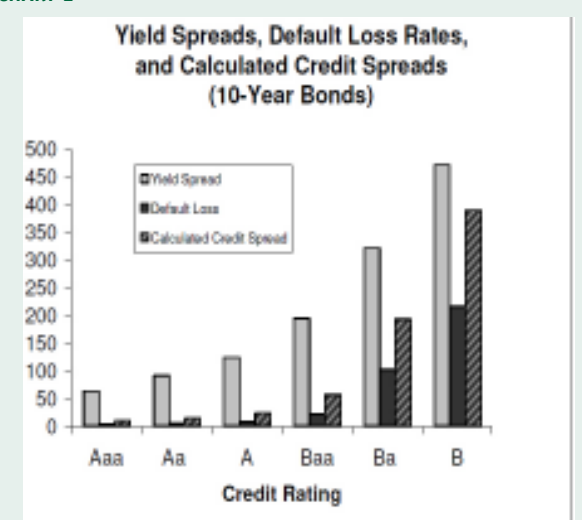


Chart 1, taken from the Bank of England's "Financial Stability Report" of October 2008 (available online at <http://www.bankofengland.co.uk/publications/fsr/2008/fsr24.htm>), shows how the credit crunch has affected the components of corporate yield. In contrast to the rough-and-ready approach used for illustration in this article, the Bank decomposed corporate bond spreads by using equity prices to estimate the value and volatility of value of each issuer's assets under differing risk assumptions, utilizing the assumption that the firm's equity holders will continue to meet the firm's obligations for as long as the value of the assets exceeds the amount due on the bonds.

Chart 2 is taken from a 2003 paper by Huang & Huang (available online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=307360), in which the authors calculated that for ten year corporate bonds "credit risk accounts for, respectively, 39%, 34%, 41%, 73%, and 93% of the spreads of corporate yields over swap rates for bonds

CHART 2



rated Aa, A, Baa, Ba, and B". In other words, corporate bonds become more dependent on the prospects for the issuer and less dependent upon overall bond market conditions as the credit quality decreases. As I like to put it, junk bonds are equities in bond clothing!

The implications of the liquidity premium for small retail investors are profound. A buy-and-hold investor can purchase corporate bonds as a component of his portfolio, accepting the risks of default and default uncertainty, which cannot be avoided, but capturing the liquidity premium at little or no real cost. In order to do this without undue risk, the corporate portfolio should be well diversified. The fact that a universe of A-rated bonds may be expected to experience average losses of 0.1% due to default does not preclude the possibility that a single A-rated bond could experience a loss of 100%. The rule of thumb for diversification is 15-20 unrelated names. Those constrained by the size of their portfolio to a lower number of names should restrict their investments to bond funds and ETFs, which have the virtue of repackaging large diversified portfolios into more manageable quantities – in exchange for a fee, of course!

*James Hymas, CFA, Hymas Investment Management,
Toronto, ON (416) 604-4204, jiHymas@himinvest.com,
www.himinvest.com, www.prefshares.com.*