



Credit derivatives and credit ratings

Joseph Pimbley of FGIC provides a summary of debt securities and looks at the rating challenge of credit derivatives.

Debt securities have evolved tremendously in the past two decades. The debt-rating agencies responded extremely well by assigning mostly reasonable ratings to the new obligations. This article offers a truncated history of new securities and the apparent rating philosophies that analysts created for them. The background provides exercise and ammunition for the new challenge, credit derivatives. Broadly speaking there are three candidate techniques for rating-debt securities with embedded credit derivatives. This article reviews the three techniques and their performance in the evaluation of typical credit-linked notes.

The pace of evolution in debt securities has been so rapid that one is tempted to substitute the word 'mutation' for 'evolution.' Fixed-coupon securities with a single obligor dominated the first century of debt issuance. Today's investor finds securities in which the coupon and principal payments and timing of such payments vary with market and credit variables. Furthermore the guarantee of payment may derive completely from the performance of a pool of assets as opposed to a good, old-fashioned single issuer.

But what about debt ratings?¹ Have they kept pace with this market mutation? Well, yes and no. To their credit, the agencies² have indeed broadly expanded their analytical techniques to assign ratings to virtually all new-wave financial products. Unfortunately some confusion has ensued. For example there now exist equity securities with debt ratings and the meaning of these debt ratings is not at all clear. Which risks are part of the rating and which are not?

Credit derivatives pose the greatest challenge to the rating agencies. As this article will discuss, debt-security evolution backed the agencies into a credit-risk corner. That is, the agencies responded to new

infusions of market risk into debt obligations by stating that the debt rating measured only the credit risk of the security. This passive definition-by-gradual-retreat left them vulnerable to the emerging ambiguity of risk. This means that there is no longer a clear distinction between credit risk and market risk.

To rate credit-linked notes (debt securities with embedded credit derivatives), the analyst must have a clear sense of the meaning of the debt rating. By deliberate intent rating agencies do not provide clear, explicit and exhaustive definitions of their ratings. To gain insight into what the ratings *should* mean, this article provides an ersatz history of debt securities and their rating implications.

Following this history lesson examples will be provided to illustrate the challenge of credit derivatives to the rating agencies, continuing with a review of the primary alternatives for rating such securities.

History of debt-security ratings

The purpose of this section is to look only at the ratings applied to debt securities and the apparent thought behind the ratings.

Conventional debt

If one defines conventional debt as an obligation that promises the investor fixed coupons and principal repayment(s) at predetermined times in which the obligor is a single, identifiable entity (ie a publicly known company), then there appear to be only two risks. The issuer (obligor) may fail to honour its contract to make timely coupon or principal payments, or the level of interest rates may rise and thereby depress the market value of the investor's bond prior to maturity.

Clearly the first risk in which the issuer may not honour its contract is central to an agency's debt rating, and just as clearly the second risk of market-value fluctuation does *not* impact the debt rating. The obvious interpretation is that the debt-rating measures default (credit) risk and not market risk. *Voilà!* Debt ratings are credit ratings.

This interpretation is wrong; neither life nor history are that simple. John Moody emphasised that his firm scanned the indenture of each debt issue to determine the quality of the investment. A central aspect of debt ratings is that they apply to debt issues and *not* to issuers. Reference to an Aaa/AAA issuer is a misnomer.

The simplest example of the relevance of the indenture is the seniority and collateralisation of a particular debt issue within a company's hierarchy of obligations. Senior/secured debt is much safer than subordinated/unsecured debt. The agencies reward the former with a higher rating than the latter, yet the probabilities of default of the two classes of debt are identical with standard cross-default provisions. Agency debt ratings, therefore, do not simply measure probability of default despite the claims of some agency analysts.

Admittedly one may argue that incorporating seniority and collateralisation into a debt rating does not disprove the claim that a debt rating is a credit rating. There are other possibilities. Suppose an early railroad bond contractually permitted the issuer to repay only a fraction of the original principal in the event of a rail workers' strike. Or what if an indenture stated that a California municipality need not return par following a large earthquake? Finally what if a gold mine's debt obligation specified a principal repayment indexed to the spot gold price at maturity? In all these cases the issuer seeks to tailor its repayment obligation to their own financial circumstances.

If an agency debt rating were purely a credit rating then the suggestions of the previous paragraph would have no rating impact. And yet all of us, both within and outwith the rating agencies, feel intuitively that an Aaa/AAA bond should not engender losses to the investor due to high-probability events such as an employee strike, a California earthquake or a drop in the gold price.

One concludes that a debt rating can and should include noncredit aspects of a debt issue. On the other hand it seems equally clear that the rating should not attempt to incorporate the risk to the market value of the bond stemming from rising and falling interest rates. John Moody did, however, ponder the possibility that investors might not understand that his investment ratings did not encompass interest-rate risk.

Callable bonds

For many decades a significant amount of issuers have retained the right to call their outstanding debt when prevailing interest rates or the issuer's credit quality render the early call profitable. The investors in such debt have sold (primarily) interest-rate options. The rating agencies apparently assign no rating impact to the investors' short-option position.

What if the issuer could call the debt below par, however? (Standard-call features dictate issuer calls at or above par.) The investor would receive a generous coupon as compensation for the sale of the expensive option and the increased probability of receiving less than par at the call date. It is difficult to imagine or defend a high investment-grade rating on a security with a significant probability of loss. It is therefore likely that the rating agencies would not ignore this loss of principal in a subpar callable bond.

Convertible bonds

Standard convertible bonds are debt obligations that are convertible to equity at the option of the investor. These instruments contain equity risk since a large increase in the relevant equity will benefit the bondholder. Again there appears to be no rating agency impact of the investor's convertibility option. These standard convertible bonds originated many years ago.

A more recent innovation were mandatory convertible bonds in which the investor must accept a long or short equity position upon maturity of the bond. Investors in such securities did not buy debt, but merely entered a collateralised forward-equity transaction. Surprisingly the rating agencies ignored this mandatory conversion feature in assigning debt ratings to the instruments. One might argue that such securities should not have any debt rating.

There is of course a profound difference between the standard and mandatory convertible bonds. The former guarantees the investor a return of principal and contractual coupons or the equity value, whichever is better, with the likelihood the debt rating signifies. The latter security may deliver a significant loss of principal to the investor irrespective of the debt rating.

Floating-rate notes

Floating-rate notes (FRNs) specify the debt-obligation coupon as a spread to an interest-rate index (such as Libor). While these securities seem quite tame today, the debt-rating implications were not at all clear initially. The coupon payment is a fluctuating market-variable. What does it mean to have an Aaa/AAA rating on an instrument whose future coupons are unknown? Will investors understand that the coupon on their Aaa/AAA security may fall by hundreds of basis points with significant probability?

Of course the rating agencies did not attempt to examine the risk of a falling, index-based coupon as part of their debt ratings. This decision was almost certainly correct. Many people concluded from this exercise that debt ratings measured the likelihood of issuer performance on contracts with index-based terms and conditions.

Extension-linked notes

Debt securities may have indeterminate final maturities. It has already been shown that the issuer of a callable bond may return principal to the investor prior to scheduled maturity. The bond maturity, therefore, varies with market conditions.

Many asset-backed securities (ABS) take the variable maturity a step further. At issuance the ABS will have a projected amortisation schedule. The security will pay down more or less quickly depending on the performance of the collateral and market conditions. Unlike the callable bond it is not clear how one might characterise an early or late amortisation as an interest-rate or credit option.

Mortgage-backed securities (MBS)³ constitute a third recognisable class of extension-linked obligations. As with the callable bond the investor is short a call option. The mortgage-call (prepayment) option is essentially impossible to value and hedge, however. Investors often buy MBS with very short expected maturities but with a legal final maturity of 30 years. The risk, therefore, of an extended maturity may exceed that of a shortened maturity.

In all these incarnations the rating agencies effectively take no account of the maturity variability. The security must generally repay principal at or before a legal final maturity, but any prospect of unscheduled repayment prior to maturity is immaterial to the rating. Bear in mind, however, that the investor receives full principal with undiminished coupons on remaining principal in these securities. It is simply the timing that is uncertain.

It would be an inappropriate leap of logic to conclude that ratings must never address variable-maturity features within debt obligations. For example imagine that an issuer gave itself the option to withhold principal repayment for a year under certain economic-distress conditions. Clearly such a deferred payment is tantamount to default. It is all but certain that the rating agencies would refuse to rate a debt obligation with such a clause in the indenture. But worded differently this provision would not differ greatly from the plain-vanilla bond call feature (in which the issuer pushes the legal final maturity out a year).

Principal-linked notes

True principal-linked debt obligations, in which the issuer's principal repayment obligation varies in a prescribed manner with market variables, have emerged

quite recently. The first and most notorious is the mortgage-backed interest-only (mortgage IO) security. In this security the investor receives interest payments from a mortgage pool. Mortgages that prepay or default cease paying interest and the IO investor receives nothing from the loan principal payment/recovery.

There may be some nominal, essentially fictitious par amount in the IO that the security guarantees to the investor. In reality, however, the investor will suffer a loss of principal if the underlying mortgages prepay quickly. Given typical prepayment volatility, the IO investor bears significant risk of recouping less than they invested.

The rating agencies, however, often assign Aaa/AAA ratings to mortgage IOs on the basis of the issuer's ability to pay whatever the investor is due. If nothing else this practice appears mistaken on the basis of investor (ie consumer) perception of the Aaa/AAA rating. The agencies risk bad publicity and their franchises when they apply their loftiest ratings to securities which regularly inflict severe losses on investors.

Dealers have also concocted many types of structured notes in which a market variable dictates the principal repayment. In a standard callable bond, for example, the investor receives par or the conversion stock price at maturity, whichever is greater. In mandatory convertibles, however, the security simply pays the reference stock price, which results in either a gain or loss of principal at maturity. Consistent with an earlier example, it is also feasible to issue a note with principal repayment tied to the price of gold (depending on the precise terms, a gold mining company might be a natural issuer or buyer).

There's been very little rating history for these (non-mortgage IO) principal-linked securities. It appears that the agencies will ignore any loss of principal to the investor due to the contractual terms. That is, they will continue to assign Aaa/AAA ratings to instruments with high probability of loss arising from mortgage prepayments, volatile equity, gold prices, etc.

Summary of this historical perspective

The purpose of working through this rating history is not simply to rate the rating agencies. Rather, the next section will show that the recent advent of credit derivatives poses a curious intellectual challenge to debt-rating philosophy. It behoves us to look to past rating decisions to seek guidance and consistency.

The common view in financial markets, and even within rating agencies themselves, is that debt ratings are credit ratings. Much of the historical discussion is consistent with this premise. Issuer creditworthiness is certainly

central to the rating process and many market risks (interest-rate levels, prepayments, early calls, equity prices) have no impact on the debt rating.

To infer that debt ratings must only measure credit risks, however, would violate the John Moody prerogative to scan the indenture and ferret out terms that diminish the investment quality of the subject security. For example if one found, deep in the fine print of the indenture, that the issuer reserves the right to repay the investors' principal with a fixed number of shares of common stock (regardless of the stock's market value) would not the rating analyst be alarmed at the embedded market risk?

With this ambiguity of precisely which risks should impact debt ratings and which should not, the rating agencies have clearly made some good choices. In hindsight the rating philosophies for callable bonds, standard convertibles and FRNs appear sound. On the other hand the ratings for mortgage IOs and mandatory convertibles are arguably flawed. One hopes they do not serve as precedents for future ratings.

Challenge of credit derivatives

This section will make no attempt to catalogue all known forms of credit derivatives, but will detail a small number of examples to illustrate the issues they pose for the rating agencies.

Imagine firstly a security in which the issuer's 'promise' to the investor is contingent on the credit performance of another asset. For example the Aaa/AAA issuer⁴ might make full principal and interest payments as long as a B2/B reference-debt security is not in default. If the reference security defaults the investor receives nothing. One can apply the label 'credit-switch note' to this security.

Or consider a more subtle variant known as the virtual Brady. The Aaa/AAA issuer guarantees principal repayment at maturity. But the coupons will drop to zero if a B2/B reference security defaults.

The credit-switch note and virtual Brady examples raise the distinction between the issuer's performance on a contract and the existence of other credit risks within the security. One may confuse the situation further by striking all language within the indenture that refers to default or credit event of a reference-debt security.

Suppose the issuer's principal repayment and/or coupon obligation derive instead from the price or yield spread to the US Treasury curve of this reference security. One could then replicate the virtual Brady with no-default language. That is the investor would have the Aaa/AAA guarantee of principal repayment

and the coupons would be digital-call options on the credit spread of the B2/B reference security. For example one might set the strike spread at 600bp so that the investor receives full coupons when the spread to the US Treasury curve is less than 600bp but receives zero when the credit spread exceeds this strike.

Primary alternatives

Confronted with this challenge to rate debt securities with embedded credit derivatives, the agencies have three options: issuer performance, expanded credit and investment quality.

Issuer performance

The easiest and, to some observers, the most intuitive approach is to measure the issuer's ability to honour the terms of the contract. Hence the credit-switch note that was described earlier would earn the Aaa/AAA rating. Presumably the agencies could leave it to the investor to determine whether the terms of the indenture were acceptable. The agency would only rate the issuer's ability to calculate and make the contracted payments.

The issuer performance approach is consistent with past ratings. In FRNs, mortgage IOs and mandatory convertibles the agencies focus on the issuer's ability to make coupon and principal payments regardless of how low or high these may go. Issuer performance merely codifies this practice. The only distinction between these securities and the credit-switch note is that the latter bears an embedded credit-versus-market risk. An investor in an evaporating mortgage IO may not appreciate the need to characterise their loss in this manner.

Issuer performance provides a nonsensical answer in a variant of the credit-switch note. Imagine that one replaces the issuer with a bankruptcy-remote trust structure. Since the trust holds the B2/B security it will make scheduled payments with great (Aaa/AAA) certainty. The premier debt rating would become meaningless if one could attain it by merely adopting a trust structure.

Expanded credit

Expanded credit seeks to avoid the most obvious pitfall of issuer performance by stating that the debt rating includes both the issuer's ability to honour terms of the indenture and all embedded-credit risks. Hence a credit-switch note, whether in trust format or with a highly rated issuer, would earn the lower rating of the reference security. This result is clearly preferable to the issuer performance alternative.

The expanded credit analysis, however, must sometimes make arbitrary distinctions between market risks and credit risks. That is, a mortgage IO exhibits high probability of

loss of principal due to prepayments (a market risk) while the virtual Brady has high probability of loss of coupons due to reference-security default (a credit risk). How should one assess the digital-call options on the credit spread with which one may alternatively characterise the virtual Brady coupons? Is this risk of loss a credit or market issue? The answer is really both.

Consider linking a repayment to a bond price of issuer XYZ. It is tempting to argue that this is just a surrogate for the credit risk of XYZ and that one should therefore rate the structured security with this extra credit risk in mind. But what if, instead, the security had referenced the XYZ common-stock price? The rating agencies are already committed to considering equity prices as market variables, so expanded credit would not consider the equity-linkage. Rating agency analysts who are happy with this situation thus far must then wonder what to do if we substitute the XYZ preferred stock (which is really equity but carries a debt-like rating and has dividend-suspension risk).

Finally imagine a credit-switch note in which one replaces the reference-debt security by a large, diversified basket of bonds or by a bond index. It is not clear whether to call the bond basket/index a market or credit variable. The point of these examples, of course, is that choosing whether to call a risk a market or credit risk is often arbitrary. Basing a rating philosophy that must stand for another century on such uncertain ground is unwise.

Investment quality

The investment-quality alternative eliminates the need to define a credit-versus-market risk. Any event that would lead to an investor's loss of principal (prepayments in a mortgage IO, equity values in a downside-linked equity note, default of a reference-debt security, credit-spread widening in a reference security, etc) would contribute to the debt rating. Elimination of the requirement to define risk gives the agencies the greatest flexibility in rating the as yet unknown next generation of debt obligations.

Removing the credit/market distinction, though, requires a new distinction, between principal and coupon payments. Investment quality would continue to allow (or ignore) setting FRN coupons to an interest-rate index such as Libor. Since investment quality treats credit and market variables equally, it would permit credit-linked coupons as well (with the proviso that coupons are never negative).

The message of investment quality, then, is: 'guarantee the investor's principal and do anything with the coupon'. The greatest test of the legitimacy of this maxim stems from a long-maturity virtual Brady. With a maturity

of, for example, 30 years the guaranteed principal repayment is worth very little. The (reference-security) credit-option coupons add significant volatility to the instrument and the true credit risk, long before maturity is nearly equal to that of the reference security.

In light of the virtual Brady example for investment quality, there is no rating philosophy that is free of controversy (issuer performance gives untenable results while expanded credit relies on a risk distinction that is not defensible). While the rating agencies will likely cast their futures with expanded credit, it appears that the optimal strategy would require a judicious blend of investment quality and expanded credit.

Summary

Assigning debt ratings to securities with embedded credit derivatives forces the rating agencies to sharpen their definitions and philosophies. As is evident from the historical depictions of rating-agency actions, the agencies have apparently sometimes reacted inconsistently in their approach to new debt obligations. By omission they chose not to define and publicise the deeper meanings of their ratings.

This strategy has, in fact, worked very well. The credibility, strength and market relevance of debt ratings has actually grown in these years of debt-obligation mutation. It is clear that the market has not punished the agencies. But credit derivatives are different. They strike at the core meaning of debt ratings. The agencies no longer have the luxury of inaction.

Notes

1. By debt ratings this article means what most market participants would call credit ratings from the well known rating agencies (or nationally recognised statistical rating organisations in the simplifying terminology of US regulators). This article will avoid the term credit rating as it is both ambiguous and unnecessarily exclusive.
2. There are roughly six organisations that satisfy a reasonable definition of rating agency in the US market. Two of these constitute a near duopoly.
3. Of course MBS are a subset of ABS since the asset is a pool of residential mortgages. One tends to consider MBS and ABS as distinct since the analysis of mortgage collateral has a long and partially successful history.
4. It was previously observed that an Aaa/AAA issuer is a misnomer since only debt issues, not issuers, carry ratings. Nonetheless it is useful to employ such an imprecise term in this discussion.

