And When CDOs PIK?

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High default rates in the high-yield bond and loan market in general, and among collateralized debt obligation portfolios in particular, have caused some CDO tranches to stop paying current interest (and to then pay in-kind, or PIK). It is not unusual that investors modeling CDO returns request default scenarios severe enough to cause tranches to PIK. Given expectations of continued high default rates, we expect more CDO tranches to PIK in the years ahead.

What's happening in PIK-land? What does it mean, and what difference does it really make? In this report we:

- Define PIKing.
- Focus on structural issues behind PIKs within CDOs.
- Discuss rating agency approaches to PIKing.
- Show the relationship between PIKing and loss of IRR among CDO tranches.
- And seriously stretch the English language by making action words out of a financial abbreviation.

I. PIK BONDS

Payment-in-kind is a clearly disclosed structural feature within some bonds. It allows the issuer to—instead of paying a current coupon—increase the par value of the bond by paying the bond's then-due coupon with more of the same bonds, thus *paying in-kind*. If a $5 coupon is missed, par increases from, say, $100 to $105. The next coupon is calculated on the higher $105 par amount.

PIK securities are generally speculative-grade corporates whose issuers' future cash flows are uncertain. The option to pay in-kind helps these issuers conserve scarce cash or even avoid default. Traditional high-yield PIK bonds differ from zero-coupon bonds in that a PIK allows the issuer to decide at each coupon date whether to pay the current coupon, increase the principal amount of the debt, or even to repay previously unpaid but accrued coupons. Zeroes, of course, have a completely built-in, 100%, accrual of coupon into principal.

II. PIKs AND CDOs

In a CDO, a tranche can be denied a coupon even though the CDO has adequate cash flow to make the payment. Withheld cash flow is instead used to pay principal on the CDO's most senior tranche. This occurs through the operation of overcollateralization and interest coverage tests applied to more senior tranches.

These two tests measure, respectively, the amount of collateral par as a percent of tranche par, and the amount of collateral coupon as a percent of tranche coupon. If these ratios fall too low, available cash flow is used to pay down the senior-most tranche in the CDO until that ratio returns (or both ratios return) to conformance.

When Does a CDO PIK?

After the coupon on the senior-most (say, Class A) CDO tranche is paid, the two coverage ratios are then calculated:

$$\frac{Collateral\ Par}{Class\ A\ Par}$$

and

$$\frac{Collateral\ Coupon}{Class\ A\ Coupon}$$

If these ratios are below their triggers, Class A par must be paid down until the ratios meet their target trigger levels. Only then is any remaining cash flow available for servicing coupon on Class Bs. Thus, even though there is sufficient collateral cash flow to satisfy the Class B coupon, that cash flow is instead directed to pay down Class A principal.

It is the presence of overcollateralization and interest coverage tests on a Class A tranche that causes a Class B tranche to be PIK-able. In practice, par overcollateralization tests are more important, because they typically become binding before interest coverage tests.

There are also Class B coverage tests that come into effect after Class B interest is paid. Such ratios test collateral par and collateral coupon in relation to the sum of Class A plus B par and the sum of Class A plus B coupon, respectively:

$$\frac{Collateral\ Par}{Class\ A\ +\ B\ Par}$$

and

$$\frac{Collateral\ Coupon}{Class\ A\ +\ B\ Coupon}$$

If these tests are violated, cash flow is denied Class C until the two ratios meet their trigger levels. Class C and further subordinate tranches might also have coverage tests that divert cash flow away from still-lower tranches.

Throughout this decision tree or cash flow "waterfall," however, diverted cash flow is still applied against Class A par until it is retired (and then to subsequent classes in declining order of seniority). All coverage tests, at each tranche level, de-lever the CDO from its senior-most tranche on downward.

Why PIKable CDO Tranches . . .

The PIK-ability of subordinate tranches, and the diversion of cash flows to cause early amortization of the Class A tranche, naturally strengthens the Class A tranche. Therefore, either it can achieve a higher rating, or its size can be increased while still maintaining its original rating. CDO equityholders benefit from an overall lower cost of funds; either they have a lower coupon on the Class A tranche, or the Class A tranche, which enjoys the CDO's lowest funding cost, is larger. In either case, interest costs to the CDO are reduced, which thus increases return to equityholders.

The effectiveness of PIKing in bolstering the credit quality of the Class A tranche depends on the amount of collateral cash flow that exists in excess of Class A coupon. The higher the coupon on collateral, and the longer the tenor of collateral, the more cash flow potentially available for diversion to pay down Class A principal. The effectiveness also depends on the looseness or tightness of the overcollateralization and interest coverage tests. The tighter the coverage tests are to the CDO's original par and coupon ratios, the sooner a deterioration in those ratios will cause cash flow to be diverted to repay Class A principal.

. . . And What They Alter

The effect of cash diversion to the Class A tranche in a high-yield-backed CDO can be dramatic. It is not unusual for subordinate tranches of a CDO to have been downgraded (and to PIK without any chance of ultimate payment) while the CDO's Aaa tranche maintains its credit quality and rating. This is due to the outlook for Class A's receiving all cash due, because of the diversion of cash to Class A principal.

In determining an optimal capital structure, CDO equity must weigh reduction in the overall cost of CDO debt against the potential for equity to receive less cash flow in severe default scenarios. Distribution of collateral cash flow among tranches in a CDO is a zero-sum game. And since equity receives residual cash flow after debt tranches are satisfied, PIKing and the diversion of cash flows to Class A principal affects it the most.

First, the CDO's average cost of funds increases. Second, the CDO becomes more de-levered. Finally, less cash reaches the equity tranche, and the cash that does is delayed.

III. RATING AGENCIES AND CDO PIKING

Rating agencies have been wary of PIK CDO bonds. With the recent exception of one rating agency, they have been concerned that above a certain rating, investors do not expect their CDO to PIK; thus PIKing is viewed as a form of default. PIKing (under this interpretation) is conventional and acceptable only below a certain rating or with a qualification on the rating. Corporate PIK bonds are rarely issued by companies above a speculative-grade rating.

- ***S&P.*** S&P will not grant any CDO tranche a rating of A or higher if it has a PIK feature, unless it is clearly disclosed in the *title* of the security that interest is deferrable. For tranches seeking a rating of A- or above, S&P treats PIKing for more than a year under its stress-testing as a default. For tranches seeking a rating of BBB+ or below, the length of any PIKing under stress-testing is irrelevant, as long as the tranche eventually makes up accrued interest, interest on interest, and principal. In the distant past, a PIKable CDO tranche would have been qualified with a subscript of "r" to indicate the presence of usual risk characteristics. Now, this is inherent within the rating.
- ***Moody's.*** Until mid-2001, Moody's also refused to grant any PIK-able CDO tranche a rating of A2 or higher. Now, however, Moody's will issue ratings on a PIK-able CDO tranche up to and including the Aaa level. This is in accord with the agency's "expected loss" rating approach, which takes into account both the probability of default and the potential severity of default. That is, on an expected loss basis, a bond that PIKs but subsequently repays accrued interest (with interest on interest) has no loss. Thus, there would be no rating agency penalty, as the documentation of a CDO certainly envisions and allows PIKing. Moody's recent conversion to this policy indicates it has overcome its previous reluctance to treat interest accruals as it does current payment of interest.
- ***Fitch.*** This agency neatly makes a distinction between a CDO bond that passes its default and recovery scenarios while paying current coupon all along and a bond that accrues coupon and eventually pays it off. It will rate the former for timely payment of interest and principal, and the latter only for ultimate payment of interest and principal. Fitch makes this distinction evident in both its rating letter and the rating report on the CDO.

For investors focused on internal rate of return and indifferent to timeliness, the S&P approach to PIKable CDO tranches rated A– is overly conservative (compared to S&P's ratings of non-PIKable tranches), in that some scenarios that S&P considers a default actually do not cause any loss of IRR. For investors focused on the timely payment of cash flows, Moody's approach to PIKable CDO tranches is generous (compared to its ratings on non-PIKable tranches) in that timeliness is not factored into the expected loss methodology. Note that our comments compare PIK and non-PIKable ratings intra-agency. They do not address whether one rating agency's standards and net rating results are generally stricter or looser than another's.

It is interesting to consider how, given their approaches to rating new CDOs, each rating agency might update its rating on a CDO bond that is PIKing. For Fitch (where Fitch is addressing timely payment), a PIKing CDO tranche is in default. Therefore, a D rating would seem appropriate even if it looks as if the bond would ultimately make up accrued interest. Moody's and Fitch (where Fitch is addressing ultimate payment) would look either at the severity of IRR loss or the probability of ultimate payment, respectively, and could therefore rate a PIKing CDO tranche much higher than a D.

IV. MODELING DEFAULTS AND SMALL PIKs

We are most interested in better understanding the relationship between PIKing and loss of IRR. For example—If a bond PIKs, does that mean it is definitely going to lose IRR? Worded differently—What are the chances of a bond PIKing but eventually catching up on accrued interest and making holders whole? Also, how is the relationship between PIKing and IRR loss affected by the pattern of defaults, whether they are evenly distributed through time, or are front-loaded, or back-loaded?

Furthermore, since Moody's and S&P are newly open to more highly rated PIKable tranches, what is the effect of over- collateralization and interest coverage triggers on the first tranche (therefore making the second tranche PIKable)? And, how much does this improve the credit quality of the first tranche, yet harm that of the second or lower tranches?

To explore the effects of PIKing on CDO tranches, we model a CDO with $102.1 million of high-yield collateral, a weighted average coupon of 10.11%, and a life of seven years, all supporting tranches as described in Exhibit 1.

EXHIBIT 1
CDO Modeling Assumptions

Class	Rating	Principal	Coupon %	Over-Collateralization Trigger %	Interest Coverage Trigger %
A	Aaa	$70	5.31	121	145
B	A3	10	6.45	116	135
C	Baa2	5	7.65	110	124
D	Ba2	5	12.10	105	119
Equity	NR	10	Residual CF		

EXHIBIT 2
Constant Default Rates

Tranche	PIKing Begins	IRR Loss Begins
A3	13.50%	11.50%
Baa2	9.00	9.50
Ba2	7.00	7.00

EXHIBIT 3
Front-Loaded Defaults

Tranche	PIKing Begins	IRR Loss Begins
A3	25.00%	26.50%
Baa2	12.00	21.50
Ba2	10.50	14.50

Constant Default Rate Scenario

The constant default rate (CDR) scenario assumes that the same default percentage rate is applied annually to the then-current amount of collateral. Note that after previous defaults and recoveries, an ever-declining amount of collateral is subject to the same annual default rate. Thus, a declining amount of collateral defaults each year. The effect is analogous, but opposite, to the effect of compound interest (where interest increases each period).

As shown in Exhibit 2, we find that as the constant default rate rises, the relationship between PIKing and the loss of IRR is tranche-specific. For the A3 tranche, loss of IRR occurs at 11.5% CDR, while PIKing occurs at 13.5% CDR. The tranche loses IRR before it PIKs because of the lack of principal repayment in the tranche's last period.

For the Baa2 tranche, IRR losses begin at 9.5% and PIKing at 9.0% CDR. For the Ba2 tranche, losses and PIKing both begin at 7.0% CDR. Note that for each tranche, PIKing and IRR loss occurs close together.

Front-Loaded Default Scenario

The front-loaded default scenario assumes high defaults in the first two years of the CDO's life, followed by 4% default rates thereafter. We believe this default scenario most closely captures current economic conditions and default patterns that could result.

As shown in Exhibit 3, the front-loaded scenario shifts the onset of tranche PIKing to occur before any loss of IRR. In other words, there are more and greater examples of tranches PIKing, but later making up accrued but unpaid interest and thus making investors whole.

For the A3 tranche, PIKing begins at 25.0% while IRR loss begins at 26.5%; for the Baa tranche, PIKing begins at 12.0% and IRR losses at 21.5%. For the Ba tranche, PIKing begins at 10.5% while IRR loss begins at 14.5%.

Exhibit 4 shows the unusual shape of Baa2 cash flows under a 20% annual default rate in a CDO's first two years, right before the tranche begins to lose IRR. Note that in the middle of the tranche's life, it receives no interest

EXHIBIT 4
Baa2 Cash Flow in 20% CDR

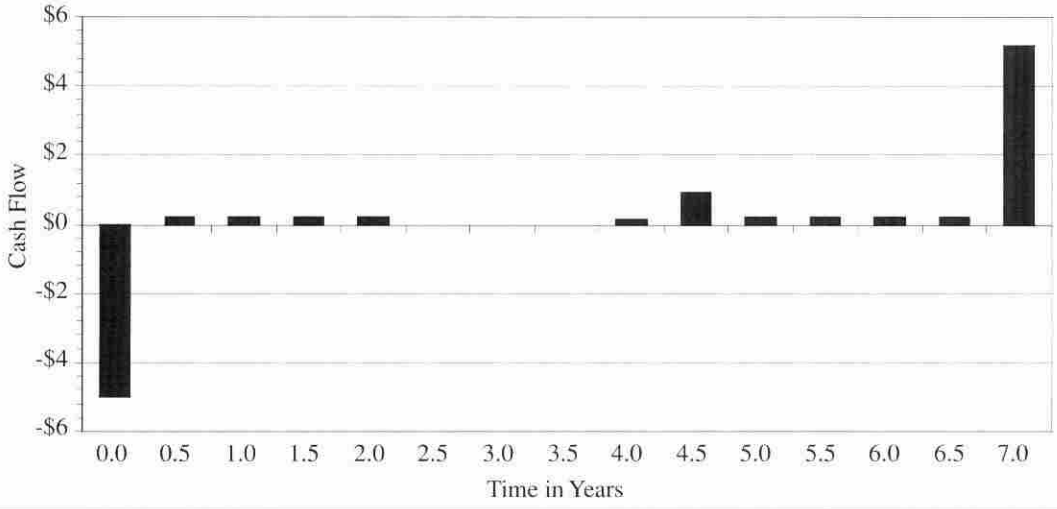


EXHIBIT 5
Baa2 Tranche Scenarios

Default Scenario	PIKing Begins	IRR Loss Begins	Difference
Two-Year Initial Defaults, 40% Recovery	12.00%	21.50%	9.50%
Two-Year Initial Defaults, 30% Recovery	10.50	18.00	7.50
Three-Year Initial Defaults, 40% Recovery	10.50	15.50	5.00
Three-Year Initial Defaults, 30% Recovery	9.00	13.00	4.00
Constant Defaults, 30% Recovery	7.50	8.50	1.00
Constant Defaults, 40% Recovery	9.00	9.50	0.50
Three-Year Final Defaults, 30% Recovery	10.50	11.50	1.00
Three-Year Final Defaults, 40% Recovery	12.00	13.50	1.50
Two-Year Final Defaults, 30% Recovery	19.50	16.50	-3.00
Two-Year Final Defaults, 40% Recovery	23.00	19.00	-4.00

for one and a half years, then a partial interest payment, and then full payment of current and accrued interest. Given today's high defaults, we are likely to see a fair number of Baa tranches PIK over the next few years, although if defaults return to reasonable levels before too much damage is done, investors will come out whole.

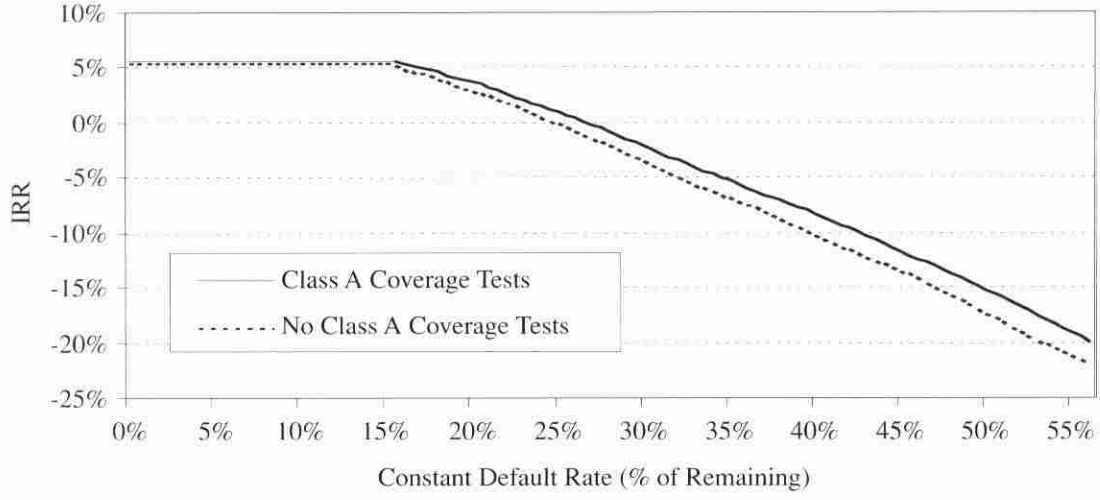
Baa Tranche

We look more closely at the Baa tranche, as the difference between the timing of IRR loss and PIKing is greatest. We examine this tranche under variations of both the constant default rate and front-loaded default scenarios, and under back-loaded default assumptions.

Under the constant default scenario, and in the front- and back-loaded default scenarios, we look at the Baa tranche using 30% and 40% recovery assumptions. In the front-loaded default scenario, we use high defaults in the CDO's first two years, followed by 4% annual defaults, as well as high defaults in the CDO's first three years and then 4% annual defaults. In the back-end default scenario, we use high defaults in two versions: for the CDO's final two years and its final three years. Before the high final defaults, the CDO experiences 4% annual defaults.

In Exhibit 5, we show the default rate for each scenario in which the tranche first begins to lose IRR, and the default rate at which it begins to PIK. If the tranche PIKs at a lower collateral default rate than when it begins

EXHIBIT 6
Class A Tranche IRR



to lose IRR, the tranche PIKs between the two default rates, but eventually catches up on accrued interest and pays the tranche holder in full. Alternatively, if the tranche loses IRR at a lower default rate than when it begins to PIK, it receives current interest, but does not receive full principal repayment.

Exhibit 5 shows that the incidence of PIKing without loss of IRR is highest in the severe front-end loss scenarios. To put it differently, the probability of PIKing seems far greater than the probability of losing IRR in front-end scenarios. Conversely, the probability of PIKing without losing IRR is non-existent in the extreme back-end scenarios.

V. CLASS A OC AND IC TESTS

We are also interested in the effect of the Class A overcollateralization and interest coverage tests. The presence of these tests can potentially cause the Class B tranche to PIK and divert cash flow to pay down Class A principal. Rating agencies were once reluctant to award high ratings to PIKable tranches. Now that Moody's and S&P have relaxed their standards on CDO PIKing, there may be more A2 and higher-rated PIK-able Class B tranches. It seems appropriate to quantify the difference that Class A coverage tests and Class B PIKing have on the credit quality of various CDO tranches.

Class A Tranche

From the point of view of the Class A tranche, the maximum it can gain from its own coverage tests is diversion of Class B interest to pay down its own principal. As shown in Exhibit 6, this helps the Class A tranche avoid IRR loss in the extreme range of 15.5%–16.5% CDR. In more severe scenarios, the advantage of having Class A coverage tests is 16–184 basis points of IRR (as also shown in Exhibit 6).

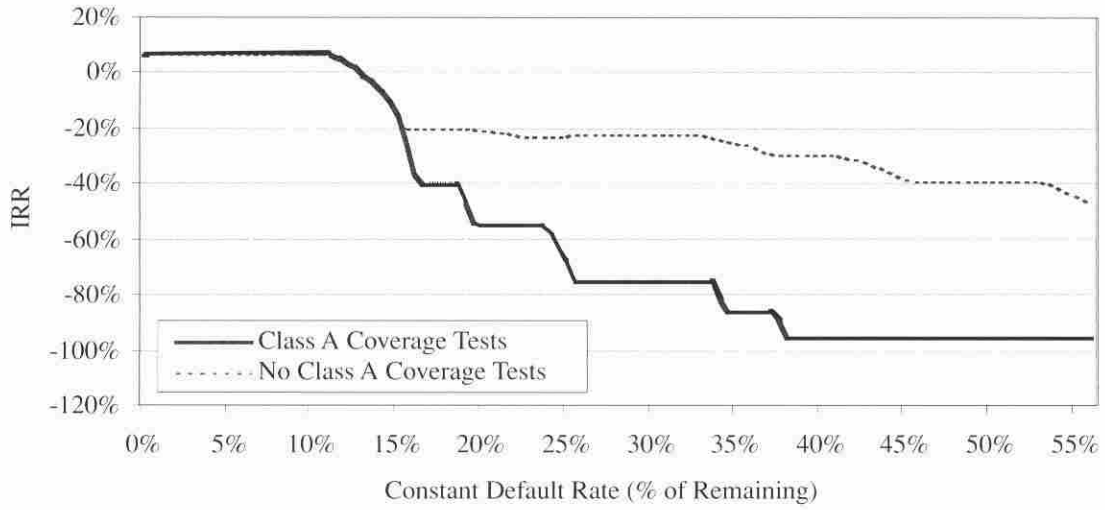
The boost or assistance provided to the Class A tranche is similar in front-loaded default scenarios.

Class B Tranche

The impact of Class A coverage tests on the Class B tranche is more complicated. The diversion of cash flow from Class B coupon to Class A principal repayment is not good for Class Bs, although paying down the Class A tranche does reduce the CDO's leverage and move the Class B tranche up in priority.

In Exhibit 7, we see that over the range of 11.5% to 15.5% constant default rate, Class A coverage tests actually help Class B IRR. In more severe CDRs, however, the Class A coverage tests severely impair the Class B tranche.

EXHIBIT 7
Class B Tranche IRR



The advantages and disadvantages of Class A coverage tests to the Class B tranche are similar in front-loaded default scenarios.

Class C and D Tranches

For the last two tranches, the presence of Class A coverage tests makes little difference. If Class A coverage tests do not divert cash from the Class C and D tranches, then Class B, or Classes B and C, coverage tests will.

This result holds true as long as the coverage tests are fairly synchronized as to when they take effect. If Class A coverage tests are tight relative to Class B and Class C coverage tests, then the introduction of a Class A coverage test will adversely affect Class C and D cash flows.

VI. CONCLUSIONS

In the most likely default scenario (of high immediate defaults followed by a return to historic averages), PIKing without the ultimate loss of IRR is more likely than loss of IRR. In our modeling, this is particularly true of the Baa tranche, less true for the Ba tranche, and even less true for the A tranche.

Given today's high defaults, we are likely to see a fair number of Baa tranches PIK over the next few years. As long as defaults return to reasonable levels, though, they will not cause loss in the long run.

Additional overcollateralization and interest coverage tests on the Class A tranche modestly help that tranche by denying coupon to the Class B tranche in severe default scenarios. The diversion also helps the Class B in the lower range of such severe defaults. Class A coverage tests make little difference to Class C and D tranches.

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