

Event of Default Provisions and the Valuation of ABS CDO Tranches

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The impact of subprime bond downgrades on collateralized debt obligation (CDO) pricing continues to remain a source of uncertainty, but two aspects are clear—many asset-backed security (ABS) CDO collateral assets will be written down and the resulting losses will significantly impair CDO liabilities. Investors are pressed to predict, however, how collateral downgrades, and a possible declaration of an event-of-default (EoD) by the CDO, will affect the distribution of remaining collateral cash flows to the various tranches of a given CDO.

The purpose of this article is threefold. To begin, we briefly review EoD provisions. Secondly, we explain how EoD provisions have reshaped the landscape for many distressed collateralized debt obligations backed by subprime mortgage bonds. Finally, we show that while many CDOs share basic EoD features, the substantive effect on the cash flows to the tranches of a CDO varies widely. To show how the most important factors affect cash flows, we provide two decision trees—one to show the diversity of ABS CDO cash flow acceleration features, and another to rank different structures by the length of interest flow to subordinate tranches.

EVENT-OF-DEFAULT PROVISIONS IN CDOs

The overwhelming majority of ABS CDOs include EoD provisions. There are

usually between five and eight EoD triggers listed in a CDO offering memorandum (OM). Most are designed to ensure responsible management of the collateral and timely disbursement of funds, but one depends directly on collateral performance—the senior over-collateralization test (OC test). This is the EoD OC trigger, and often the test simply states that an EoD occurs if the OC ratio on AAA liabilities falls below a specified amount (usually 100%, although we have seen deals as high as 102% and as low as 98%). More precisely, if the specified trigger were 100%, the test would be the following:

$$\frac{\text{Haircutted Par Amount of the CDO's Collateral}}{\text{Par Amount of Junior and Senior AAA Tranches}} < 100\% \quad (1)$$

where “Haircutted Par Amount of the CDO’s Collateral” in the numerator of the OC ratio given in Equation (1) is the par amount of CDO collateral, reduced according to collateral writedowns and downgrades. However, not all tests provide for the haircutting of collateral for ratings downgrades. We refer to Equation (1) as an *EoD OC test* to distinguish it from familiar over-collateralization tests that simply divert collateral cash flows. The EoD OC test applies even to *triggerless* CDOs.

If an EoD occurs due to a breach of the junior AAA OC test, the *controlling class holder* (or the majority of the controlling class holders)

has the right to declare an acceleration. In the overwhelming majority of outstanding deals, the controlling class is the super-senior tranche; less frequently it also includes the junior AAA and the AA tranches.

In most cases, acceleration means that the reinvestment period is terminated (if this has not already occurred as a result of the static test, which will be discussed later) and all cash flows (both principal and interest) are diverted to the controlling class holder. In many cases, once acceleration is declared, the BBB, A, and probably AA classes no longer receive interest cash flows. An EoD due to breaching the junior AAA OC test also allows the controlling class(es) to liquidate the deal by selling collateral. Given the price of CDO collateral versus the cash flow that collateral can be reasonably expected to generate, we would not normally expect to see that right exercised. There might be cases, however, where the controlling class would have an incentive to simultaneously order liquidation and bid for the collateral. This incentive would exist in the cases where acceleration does not cut off cash flows to subordinate CDO tranches.

CDO investors should also be aware of two other tests. Some CDOs apply a *static test* or *reinvestment test* which stops reinvestment when breached. In addition, most deals also have a *sequential test*. If this test is breached, principal flows sequentially to the tranches by seniority, rather than pro rata to the entire capital structure as per the original waterfall. These tests are independent of the EoD test.

HOW COLLATERAL DOWNGRADES AFFECT EoD, STATIC, AND SEQUENTIAL TESTS

Once a downgrade below Baa occurs, mezzanine ABS CDO collateral is generally accounted for at less than face value. A series of haircuts is used, as shown in Exhibit 1. Thus, B collateral has a haircut of 30% and is valued at (100% minus the haircut), or 70%, and CCC

EXHIBIT 1 Example Haircuts on CDOs

CDOs	
Rating Level	Haircut
BB	10%
B	30%
CCC	50%
Default/C	75% or market value

collateral has a 50% haircut and is valued at 50%. There is generally a permissible amount of BB bonds (usually 5%–10%); any amount over this limit is subject to a 10% haircut.

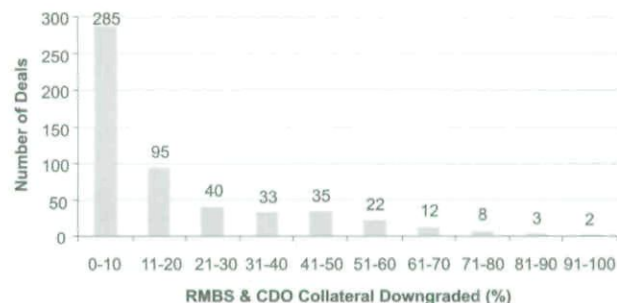
Let's say a CDO has 20% of its collateral downgraded to CCC and 60% downgraded to B. Assume that the par amount of liabilities at the junior AAA level and above is \$75. That becomes the calculated value for the denominator of the OC ratio in Equation (1). This means that the numerator of Equation (1), that is, the haircutted portfolio par, must be higher than \$75 or an EoD has occurred. In our simple example, the haircut value of \$100 face amount of collateral is \$72, calculated as

$$[\$20 \text{ CCC} \times 50\% \text{ value}] + [\$60 \text{ B} \times 70\% \text{ value}] \\ + [\$20 \text{ BBB or above} \times 100\% \text{ value}]$$

Because the value of the portfolio collateral is below \$75, this constitutes an EoD.

Exhibit 2 shows the rating downgrade distributions of the collateral portfolios of 522 ABS CDOs as of October 16, 2007. We included downgrades on residential mortgage-backed securities (RMBS) and CDOs owned by the CDO. Note that 115 of these CDOs have had more than 30% of their collateral downgraded. Exhibit 3 is a histogram on the average number of notches that deal collateral has been downgraded. Note that in 50 deals the collateral has been downgraded by more than three notches, and in 18 deals, downgrades total four notches. Our figures present notching as of the entire deal. For example, if 50% of the collateral was downgraded an average of four notches, we would report the deal as experiencing a two-notch downgrade.¹

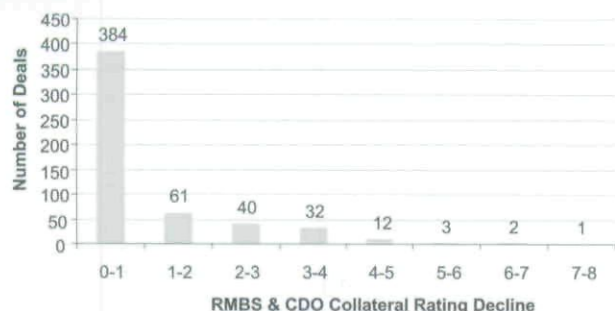
EXHIBIT 2 RMBS and CDO Collateral Downgraded



Data obtained from Moody's.

EXHIBIT 3

CDO Downgrades



Data obtained from Moody's.

An investor cannot determine if an EoD has occurred just by looking at the percentage of the deal downgraded or the average number of notches downgraded. Investors must look deal by deal for the exact haircuts and attachment points. At least 28 CDOs to date have had collateral downgrades sufficient to declare an EoD.

These EoD triggers usually increase the attractiveness of super-senior tranches and decrease the attractiveness of lower-rated tranches via the redirection of cash flows. Senior tranche acceleration can be very powerful. To illustrate this, assume a deal's capital structure is 63% unfunded super-senior and 37% lower-rated cash tranches. Further assume that the synthetic portion of the CDO portfolio is also 63% (which makes the math easy, without any conceptual loss). Assume that the ABS CDO receives LIBOR + 250 bps on its \$37 cash portfolio and 250 bps on the \$63 of its portfolio where it sold synthetic protection. Thus, the super-senior is entitled to the entire cash flow of $2.50\% \times \$63 + (\text{LIBOR} + 2.50) \times \37 .

If LIBOR is assumed to be 4.75%, then the cash flow to the super senior is \$4.26. This cash flow goes to pay the super-senior coupon and into the deal's reserve fund to defease the super-senior notional amount. If the coupon is 25 bps, then \$0.16 ($0.0025 \times \63) is needed to pay the coupon. The remaining \$4.10 is used to amortize the \$63 notional amount of the super-senior bond, for a 6.51% annual amortization rate.

In times like these, liquidity in the CDO market is very low. Stated differently, during such periods of low market liquidity very little trading in CDOs is undertaken as the market digests information about EoD provisions and tries to ascertain proper valuation. Clearly, during such periods, valuation becomes more cumbersome and dependent not only on default and delinquencies on the

underlying collateral, but also upon how quickly the rating agencies move to downgrade CDO collateral.

Subordinate Tranche Cash Flow

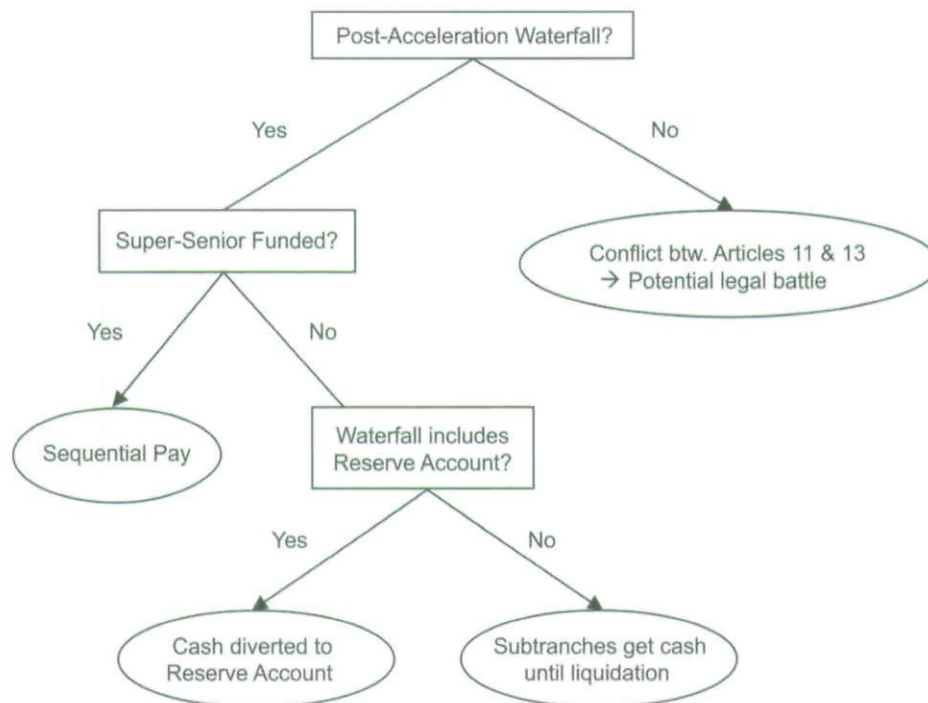
As we alluded to earlier, a tricky point is whether tripping the EoD OC trigger results in all subordinate tranches being denied interest payments until the senior tranche is retired. The controlling class (usually the holders of the super-senior notes) generally has the right to choose whether to 1) liquidate the assets, 2) call the notes immediately due and payable, or 3) do nothing. In situations where secondary ABS trading is weak and prices are depressed, liquidation is unlikely unless the controlling class is prepared to bid for the assets itself, as mentioned earlier. If it does not, the question becomes: what happens if the notes are called due? Exhibit 4 shows how the most important structural variations work.

The first split shown in the diagram is between deals which define a separate waterfall of payments to be followed in acceleration. Interest cash flows to subordinate tranches may be cut off to accelerate repayment of principal to the senior tranches, depending on the language of the indenture. Sometimes, the Trustee's instructions seem to conflict: they must follow the directive of the controlling class (i.e., pay back senior principal immediately), but also make payments according to the priority of payments (i.e., pay through the waterfall). Lawyers for senior and subordinate investors are beginning to draw battle lines over whether, in the absence of a specific EoD waterfall, subordination provisions in the indenture (which require that upon the occurrence of an EoD senior investors are paid in full before junior investors) would override priority of payments provisions.

Now let's suppose that some cash flows are, in fact, diverted from subordinate tranches (acceleration for the seniors). We have encountered different types of acceleration, so it is important to identify which cash flows are cut off and where they end up. In the most straightforward scenario, cash flows to subordinate tranches are completely shut down and all cash is used to pay interest and principal to the AAA tranches, in order of seniority. Another possibility is that principal cash flows to subordinate tranches are cut off to pay down the senior notes, but subordinate tranches continue to receive interest payments. Understanding what type of acceleration occurs in an EoD is particularly important in valuing subordinate tranches, where it could mean the difference

EXHIBIT 4

Acceleration Structures



between receiving years of coupon interest or being cut off immediately.

The next variation, shown on the left in Exhibit 4, is between funded and synthetic super-senior tranches.² If it is funded, then acceleration means amortization of senior principal. Otherwise, as shown in the third split, the result of acceleration depends on whether the post-acceleration waterfall includes the reserve account (set up to bear the burden of making CDS payments on reference assets). An unfunded super-senior tranche will feel the pain of downgrades and writedowns much more intensely if cash flows are not diverted to the reserve account, because in that case interest payments continue down the capital structure while the CDS burden falls on the super-seniors. In this situation, pressure to liquidate is very strong.

Note that failing the EoD test is not the only thing that can divert cash flows. As mentioned earlier, traditional ABS CDOs have several OC tests, corresponding to various tranches of a given deal. If the threshold level of OC for that tranche is crossed, cash flows to tranches junior to it are cut off to pay down senior principal. Generally, these OC triggers, unlike EoD, affect cash flows only until the test comes back into compliance, then cash

flows switch back to the normal waterfall. As an example, say a deal requires 106% OC for the single-A tranche. If single-A OC falls from 107% to 105%, then all tranches subordinate to single-A *pay-in-kind* (i.e., they accrue interest instead of receiving a cash coupon payment). Assuming haircut collateral par remains constant, the single-A OC ratio will increase at each payment date, and the single-A OC ratio will soon climb back above 106%. From that point forward, the subordinate tranches can receive the maximum portion of their interest payments in cash that allows the OC test to remain in compliance.

Cash flows to subordinate tranches of a triggerless CDO may be much greater, especially if the CDO does not include an OC test in the EoD provisions or if that test does not include ratings-based collateral haircuts. This type of deal will pay its lower-rated tranches for a much longer period of time, paying interest down the interest waterfall to all tranches until the collateral totally evaporates.

Valuation Walk-Through

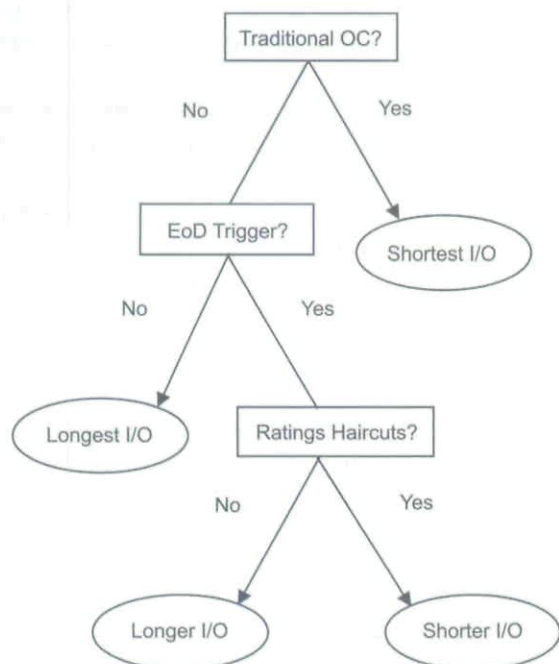
To value the various tranches of a given CDO, an investor must first determine what cash flow triggers are in place as well as whether ratings haircuts are applied to

downgraded collateral in calculating the relevant ratios. In Exhibit 5, we diagram the process and show the relative length of time that interest payments will be paid to subordinate CDO tranches. At the top of the exhibit, we ask if there are traditional OC tests. In deals which have OC tests, the levels are set to trip well in advance of the EoD trigger (if there is one), should there be writedowns or downgrades. Thus, deals with traditional OC triggers will be quickest to switch to sequential payment, leading to the shortest interest-only period for a subordinate tranche.

For deals with OC triggers, check whether any of the sequential-pay triggers have been tripped. If the sequential-pay test for a given tranche fails, cash flows to subordinate tranches are cut off until the outstanding par value of the senior tranches is reduced to a level that passes the test (i.e., by reducing the denominator of the OC ratio). Thus, predicting how OC ratios will behave, particularly those in the neighborhood of trigger levels, is critical in estimating the riskiness of cash flows going forward. Is an OC trigger going to be tripped soon? If so, will the collateral remain stable enough for the ratio to recover? Answering these questions requires assumptions about timing and severity of future collateral downgrades and writedowns.

EXHIBIT 5

ABS CDO Cash Flow Decision Tree



Following the diagram in Exhibit 5 downward, again from the perspective of a subordinate tranche investor, we show that the next step in valuing interest payments involves EoD. Is there a waterfall test, and if so, does it apply ratings haircuts? Subordinate tranches can survive significantly longer in deals where ratings haircuts are not applied to the EoD, since downgrades generally precede writedowns. Of course, the subordinate tranches in deals without any OC tests, traditional or EoD, will have the longest I/O period.

However, subordinate CDO investors have to consider the reaction of the controlling class. If an EoD'd CDO still leaks cash flow to subordinate tranches, the controlling class has a greater incentive to liquidate the CDO portfolio.

CONCLUSION

Rating agency opinion on collateral credit quality directly affects the distribution of collateral cash flow within most ABS CDOs. In this article, we reviewed event-of-default provisions in CDOs. We then explained that the critical aspect in valuing a CDO backed by underperforming assets is understanding the status of collateral and the effect collateral downgrades have upon the CDO's various cash waterfalls. Subordinate CDO holders must also consider the reaction of the controlling class.

ENDNOTES

¹We used the most severe downgrade of any of the rating agencies for our calculations. The EoD and other calculations are usually done individually for each rating agency.

²For a discussion of these structures, see Lucas, Goodman, and Fabozzi [2006].

REFERENCE

Lucas, D.J., L.S. Goodman, and F.J. Fabozzi, *Collateralized Debt Obligations: Structures and Analysis*, 2nd ed. Hoboken, NJ: John Wiley & Sons, 2006.

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