# ProForma2™ – PF2′s CDO Waterfall Model (last updated 05/01/08)

ProForma2™ is an object-oriented, VBA encoded model that has the flexibility to run multiple scenarios. The model applies user-specified default, recovery, and prepayment assumptions to each collateral bucket, and passes resulting proceeds through the CDO's waterfall, according to each CDO's capital structure.

```
If isReinvestmentPeriod Then
'obtain cure amount for class D OC test
    cure = ocTest(IP, PP, True, adjPerformingPar + PP, _
            1.0325, False, tranches("A1"), tranches("A2"), _
            tranches("B"), tranches("C"), tranches("D"))
'reinvest lesser of 50% Interest Proceeds and cure amount
    reinvestments = reinvest(reinvestments, IP, 0, _
                    min(0.5 * IP, cure))
'reinvest all Principal Proceeds
    reinvestments = reinvest(reinvestments, PP, 0)
Else
'redeem all tranches sequentially
    paid = tranches("A1").payPrincipal(PP, 0)
    paid = tranches("A2").payPrincipal(PP, 0)

    paid = tranches("B").payDeferred(PP, 0)
    paid = tranches("B").payPrincipal(PP, 0)

    paid = tranches("C").payDeferred(PP, 0)
    paid = tranches("C").payPrincipal(PP, 0)

    paid = tranches("D").payDeferred(PP, 0)
    paid = tranches("D").payPrincipal(PP, 0)
End If
```

(Left) This simple example of VBA code demonstrates the waterfall's defined distribution of interest proceeds (IP) and principal proceeds (PP) during the deal's reinvestment and amortization periods.

Inputs to the model include the liability structure, collateral stratifications and assumptions. Based on the encoded waterfall for each deal, the model will output a vector of cashflows received by each CDO tranche, reflecting the assumptions provided on the underlying assets.

In turn, these cashflows are discounted – using the discount margin consistent with PF2's policies and procedures (which take into account PF2's qualitative assessments) – to obtain their present value, and hence PF2's evaluation of the "fair value" of the tranche.

## Liability Structure

Each deal is characterized by, among other things, its payment frequency, capital structure, coverage tests, fee structure, hedges and its priority of payments waterfall, all of which are defined in the deal's indenture or other applicable legal documents. As necessary, these attributes may be revised as the deal matures (i.e., to reflect deal amendments, rating actions, tranche principal amortizations, deferred interest payments, etc.).

| | |
|---|---|
| Latest Data Date | 1/1/2008 |
| Pricing Date | 4/17/2008 |
| Deal Name | xxx |
| CUSIP | xxx |
| Closing Date | 12/21/2006 |
| 1st Payment Date | 4/20/2007 |
| Last Reinvestment Date | 1/20/2014 |
| Maturity Date | 1/20/2021 |
| Deal Frequency | Quarterly |

**Ongoing Fees**

| Fee | Coupon Type | Coupon / Spread | Deferred Interest |
|---|---|---|---|
| Admin | fixed | 0.05% | 0 |
| BaseCM | fixed | 0.15% | 0 |
| SubCM | fixed | 0.35% | 0 |
| IncentiveCM | fixed | 0.20% | 0 |

**Capital Structure**

| Name | CUSIP | Ratings Initial | Ratings Current | Principal Initial | Principal Current | PIKable | Deferred Interest | Coupon Type | Coupon / Spread |
|---|---|---|---|---|---|---|---|---|---|
| A1 | xxx | Aaa | Aaa | 320,500,000 | 320,500,000 | FALSE | 0 | floating | 0.25% |
| A2 | xxx | Aa2 | Aa2 | 24,750,000 | 24,750,000 | FALSE | 0 | floating | 0.39% |
| B | xxx | A2 | A2 | 25,000,000 | 25,000,000 | TRUE | 0 | floating | 0.75% |
| C | xxx | Baa2 | Baa2 | 20,250,000 | 20,250,000 | TRUE | 0 | floating | 1.45% |
| D | xxx | Ba2 | Ba2 | 19,000,000 | 19,000,000 | TRUE | 0 | floating | 3.70% |
| Equity | xxx | | | 40,500,000 | 40,500,000 | TRUE | | residual | |

(Above) Inputs in black font are entered when the deal is initially modeled. Inputs in blue font are revised as new information becomes available.

In addition, ProForma2™ allows the user to input (1) a tranche's historical cashflows (for tranches whose cashflows may be affected by turbo features or other equity IRR-dependent clauses), and (2) rating haircuts (for rating-based par haircut adjustments to the numerator of coverage tests, if applicable).

## Collateral

Any number of buckets can be created to represent desirable stratifications of the CDO's collateral. As the model runs, the collateral will behave according to a set of both bucket-specific and deal-specific assumptions. The resulting scenarios will then be *probability-weighted* to reflect the likelihood of their occurrence.

Examples of adjustable assumptions include:

- Default Rates and Stresses (bucket-specific/deal-specific);
- Recovery Rates and Recovery Lags (bucket-specific);
- Prepayment Speeds (bucket-specific/deal-specific);
- Default Timing Curves (bucket-specific/deal-specific);
- Interest Rate Environments and Curve Shocks (deal-specific); and
- Event of Default (EOD) Determination by Controlling Class (deal-specific)

**Collateral Buckets**                    **Default Assumptions**

| Type | Rating | Current Par | WAL | Coupon Type | Coupon / Spread | Prepay Vector | Default Type | Default Rate | Default Vector | Recovery Rate | Lag |
|------|--------|-------------|-----|-------------|-----------------|---------------|--------------|--------------|----------------|---------------|-----|
| Defaulted | N/A | 126,711,761 | N/A | N/A | N/A | Custom 1 | SDR | 100.00% | Custom 1 | 45.00% | 6 |
| 1st Lien TL A | Ba2 | 17,512,059 | 5.28 | floating | 1.78% | Custom 1 | SDR | 1.57% | Custom 1 | 70.00% | 12 |
| 2nd Lien TL B | B1 | 94,623,929 | 4.90 | floating | 2.28% | Custom 1 | SDR | 6.68% | Custom 1 | 45.00% | 12 |
| SU Bond | B2 | 303,900,757 | 4.99 | floating | 2.73% | Custom 1 | SDR | 4.98% | Custom 1 | 30.00% | 12 |

(Above) Example of a collateral portfolio stratified into 1st and 2nd lien loans, senior unsecured bonds, and defaulted assets.

| | |
|---|---|
| Default Stress | Base |
| Default Curve | Flat-Loaded |
| CPR | Base |
| Libor Stress (bps) | 0 |
| On E.O.D | accelerate |

[ Run Current Scenario ]   [ Clear ]

☑ output default rates, cashflows & graph

(Left) Example of deal-specific assumptions used in a single scenario anlysis. In this example, distributions to the deal's tranches will be accelerated upon occurence of an EOD.
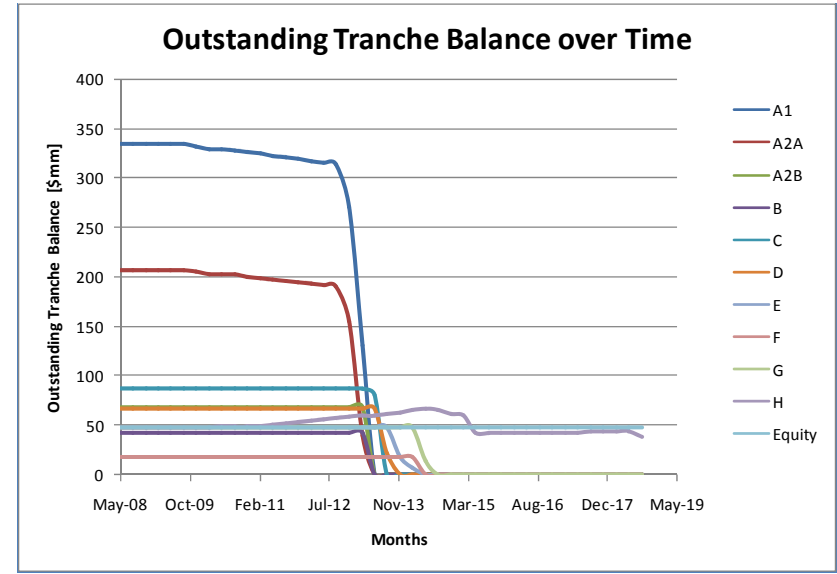

**Outstanding Tranche Balance over Time**

## Model Output

<u>Single Scenario Analysis:</u> allows the user to examine useful tranche attributes under one set of assumptions (see above example). If need be, the user has the option to output the periodic cashflows from every step in the waterfall (e.g., interest payment to tranche A1, proceeds diverted to cure the Class A O/C Test, etc.).

As can be seen from the following graphs, in a single scenario analysis, these attributes include:

- The resulting value of each tranche;
- Whether (1) interest was received when due (timely) or (2) the tranche deferred interest at a stage and either ultimately paid down this deferred interest (ultimately) or (3) failed to pay all interest due (fail);
- Principal loss, as a measure of current par, on each tranche;
- Each tranche's weighted average life and duration (Macaulay); and
- The outstanding balance of each tranche over time

<u>Matrix Analysis:</u> allows the user to specify one or more scenarios for each variable, test the resulting tranche cashflows under the variety of assumptions, and *probability-weight* the results based on the likelihood of each occurrence.

For example, the following graph shows 27 scenario outcomes, not all of which will be equally likely, and which will be weighted to reflect the probability of the scenario's occurrence, in PF2's opinion.

**Tranche A1 Prices**

| Default Rate | Default Curve | Prepayment Curve | | |
|--------------|---------------|------|------|------|
| | | Base | Slow | Fast |
| Base Case | Front-Loaded | 91.88% | 91.83% | 91.89% |
| | Mid-Loaded | 91.77% | 91.72% | 91.77% |
| | Back-Loaded | 91.98% | 91.92% | 92.02% |
| Expected Case | Front-Loaded | 93.37% | 93.29% | 93.41% |
| | Mid-Loaded | 92.23% | 92.17% | 92.26% |
| | Back-Loaded | 94.13% | 93.91% | 94.25% |
| Stressed Case | Front-Loaded | 93.65% | 93.97% | 92.61% |
| | Mid-Loaded | 95.45% | 94.77% | 96.42% |
| | Back-Loaded | 94.96% | 94.36% | 95.73% |

(Above) 27 example outcomes based on: 3 prepayment scenarios; 3 default timing profiles; 3 default rate scenarios; and 1 EOD assumption (accelerate). Alternative matrix outputs, such as those shown in the Single Scenario Analysis, may also be obtained.

| Tranche | Price | Interest | Principal | WAL | Duration | Principal Window | Yield / IRR |
|---------|-------|----------|-----------|-----|----------|------------------|-------------|
| A2A (Sr. Aaa) | 92.32% | Timely | No Loss | 4.40 | 3.97 | 11/25/2009 - 5/25/2013 | 6.72% |
| A1 (Mezz. Aaa) | 91.63% | Timely | No Loss | 4.47 | 4.03 | 11/25/2009 - 5/25/2013 | 6.92% |
| A2B (Jr. Aaa) | 89.67% | Timely | No Loss | 4.69 | 4.20 | 5/25/2013 - 5/25/2013 | 7.49% |
| B (Aa2) | 83.18% | Timely | No Loss | 4.69 | 4.17 | 5/25/2013 - 5/25/2013 | 9.41% |
| C (A2) | 76.33% | Timely | No Loss | 4.85 | 4.20 | 5/25/2013 - 2/25/2014 | 11.86% |
| D (Baa3) | 67.24% | Timely | No Loss | 5.63 | 4.53 | 2/25/2014 - 5/25/2014 | 15.22% |
| E (Ba3) | 54.65% | Ultimate | No Loss | 5.69 | 3.96 | 5/25/2014 - 5/25/2014 | 24.01% |
| F (B3) | 46.50% | Ultimate | No Loss | 5.69 | 3.36 | 5/25/2014 - 5/25/2014 | 33.16% |
| G (NR) | 31.08% | Ultimate | No Loss | 6.53 | 2.93 | 8/25/2014 - 5/25/2015 | 44.64% |
| H (NR) | 20.07% | Ultimate | 74.1% Loss | 6.69 | 2.79 | 5/25/2015 - 5/25/2015 | 44.69% |
| Equity (NR) | 21.51% | n/a | n/a | n/a | 0.52 | n/a | 39.75% |