



Weekly Post: Value Loans based on Loss Rate – Clean OAS and the Recovery Rate

The Allowance for Loan and Lease Loss (ALLL) for credit risk and fair valuation of loans for market risk are both important for understanding risk relative to its impact on capital, earnings and regulatory reporting. Previously known as the reserve for bad debts, the ALLL factor and the loan fair value should both capture the expected default losses and the two valuations should be reconciled and integrated into the regulatory reports for stress testing and basis risk in the interest rate risk reports. Adequate management of the allowance is an integral part of a bank's credit risk management process. Additionally, the Contingency Funding Plan (quantitative assessment) default experience has to be adjusted as the adverse scenario deteriorates and the projected losses increased, thus integrating credit risk and market risks into your CFP.

Incorporate credit analysis to valuing loans to determine profitability and risk thus understanding which loans you may want to Sell or to Keep on the book.

Challenge:

Typically, the ALLL factor is determined by using the historical default rate with a qualitative and economic adjustment factor. In essence, the ALLL factor is an estimate of the loss rate of a loan.

- *How can the ALLL provision be used to determine the fair value of a particular loan?*

Solution:

The discounted cash flow approach is the most common method used to value a loan. For clarity of exposition, consider a fixed rate loan with a fixed interest rate and maturity exceeding one year. When the loan defaults, we assume that there is a recovery rate. When the loan is initially originated at par, then the loan fair valuation model can be used to determine the clean Option Adjusted Spread (OAS) value. The fair value of the loan in the subsequent period will be determined by this clean OAS.

- The clean OAS represents the profit released when the loan is funded by instruments based off the funds transfer pricing curve or the funding curve. Therefore, when a sub-prime loan, with a higher loss rate, is priced as a prime loan, then the clean OAS would be lowered for the sub-prime loan.
- The present value of credit losses of the loan over its life can be calculated by the difference of the fair values with and without the loss rate. This value can be used for the loss provision per proposed new regulation.



Clean OAS is used as a way to measure of the profitability of a loan. Thus allowing you to decide whether to keep the loan or sell it. The higher the clean OAS value for the loan, the higher the expected profitability.

Clean OAS is measure of profitability since it is a spread above the FTP or funding curve. In essence, clean OAS is akin to the net margin of a loan, but isolated from shape of the yield curve and the embedded option effect. The clean OAS should exceed the required returns of the bank, cover the cost of the reserve to cover the risk while simultaneously taking into account the intangible value of customer relationship.

Numerical Example:

Consider a mortgage loan pool with four year maturity. The market rate is constant at 2%; the loan interest rate is 5% and the face value is \$100 million which equals the fair value (or alternatively called economic value). Assuming the recovery rate will be 85% in the future and the loss rate will be 1%, then expected cash flows and financial statements will appear as follows:

| year | Interest Income | outstanding Balance | charge off | recovery | B/S ALLL Prov | I/S Income |
|------|-----------------|---------------------|--------------|------------|---------------|--------------|
| 0 | | \$ 100,000,000 | | | \$ 1,000,000 | |
| 1 | \$ 4,950,000 | \$ 99,000,000 | \$ 1,000,000 | \$ 850,000 | \$ 990,000 | \$ 4,810,000 |
| 2 | \$ 4,900,500 | \$ 98,010,000 | \$ 990,000 | \$ 841,500 | \$ 980,100 | \$ 4,761,900 |
| 3 | \$ 4,851,495 | \$ 97,029,900 | \$ 980,100 | \$ 833,085 | \$ 970,299 | \$ 4,714,281 |
| 4 | \$ 4,802,980 | \$ 96,059,601 | \$ 970,299 | \$ 824,754 | \$ 960,596 | \$ 4,667,138 |

The ALLL provision on the balance sheet equals 1% of the outstanding balance. The income is calculated as interest income plus recovery net of the Charge Off and the change in ALLL provision. The cash flow is the interest income and the recovery for each period and at maturity the bank receives the remaining outstanding and its interests.

When the discounted present value method is applied to the cash flow using the discount rate of the market rate (2%) and the clean OAS is 280 basis points, the fair value is par. Using this clean OAS, assuming no default, the life time provision is calculated to be \$712,497.30, as mentioned above..

Since the recovery ratio is significant for this loan type, the life time provision is in fact less than the ALLL provision factor of 1% and the clean OAS can be significantly higher than the net loss rate, defined as the loss rate net of the recovery.

The figure below shows the quarterly trend of the Net Loss to Average Total Loans &Leases (%) over the past four years for three groups of insured savings banks based on their size using their CALL data. The trends show that the larger banks have incurred higher net loss rates after the financial crisis than the smaller institutions.



The main input data for a loan valuation are the expected loss rate and the recovery rate. An example of the input data is given below:

| | Loss rates | Recovery Rates |
|--|------------|----------------|
| Unimpaired / Non-Classified Loans | | |
| Construction, 1-4 | 1.655% | 70% |
| Other Construction & Land | 2.335% | 70% |
| 1-4, Revolving | 0.027% | 70% |
| Closed End, 1st, Non-Owner Occupied | 1.802% | 85% |
| Closed End, 1st, Owner Occupied | 0.783% | 85% |
| Closed End, Junior Liens | 0.338% | 75% |
| Multifamily | 0.027% | 85% |
| Nonfarm | 0.841% | 85% |
| Government Guaranteed | 0.000% | 100% |
| Other Consumer | 1.200% | 70% |

Analogous data should be used for the classified loans (special mention and substandard) with higher loss rate probably the same as the recovery rates. Since loss rates are used for financial reporting, they may be inappropriate in estimating the expected loss. In such a case, then these factors may be adjusted (say 50% discounted) for fair valuation purpose.

Conclusions:

Your THC model can be used to generate the fair value of your loans, ensuring that the loss rates and the fair valuation model are consistent. The model can then be used for Stress Tests (where the combined interest rate risk and credit risk has to be considered).

The THC model enables you to

- determine the loan pricing and use the clean OAS to compare the profitability of individual loans



- value the provision of loan loss over the life of the loan (and assist you in satisfying a new regulation that is currently being considered).

The purpose of this exposition is to use a simple model to illustrate the salient features in valuing a loan. This general idea forms the basic idea for valuing more complex loans such as residential mortgages where there is prepayment risk combined with credit risk.

Please do not hesitate to contact THC staff if you are interested in incorporating your credit risk to your ALM.

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