



September 7, 2015

Weekly Post: Credit Risk of Residential Mortgage Loans: Pricing and Reporting

Dear Clients

The residential mortgage loans on your balance sheet do not have the same credit risk exposure even if they are all meeting your bank's underwriting standards. The credit risk of your residential mortgage loans not only affects the expected payments of the loans, but, also the loan's interest rate risk exposure. The combined effect of interest rate risk and credit risk, affect the pricing of the loans and the management of the credit risk.

Challenge

Some options that you may consider regarding your residential mortgage loans are the following; selling some loans to investors based on the loans' credit exposure, evaluating the credit analysis of the loans in a more granular level per Current Expected Credit Loss (CECL) guidance, buying loan pools from another bank, or evaluating the loan pricing in origination. In all these cases, we need to recognize that the pricing and risk reporting do not depend on the credit alone. Credit exposure also affects the expected loan prepayment schedule and hence interest rate risk.

- How to compare the pricing of loans with different credit exposures?
- How to attribute the loan yield to interest rate risk and credit risk?

Solutions

Loan credit risk affects the payment schedule in a complex way. For example, historically, low credit borrowers tend to be less likely to prepay when refinancing is more advantageous to the borrower. On the other hand, when a loan defaults, then the recovery amount is paid back sooner, though with a discount. These factors are taken into account by the prepayment-default model of mortgage loans. This prepayment-default residential model has been validated and has been backtested annually, per regulation.

Based on this loan valuation model, we can determine the attributions of the interest rates of the loans over a range of credit qualities. THC research uses a sample of recently originated (7/31) 30 year fixed rate mortgage loans and determines all the components of the yields. This way, we can identify how much we are charging for credit and for the time value, (the discount rates used for the weighted average life of the loans).



In the analysis below , we assume 25 bpt for servicing cost and for simplicity we keep LTV to be 80% while changing only the FICO score. A summary of the sample of loans is presented below

Description	Price	Int. Rate(%)	Index	Margin (%)	Servicing (BP)	WAM	FICO	LTV (%)
Fix30 800	100.00	3.587	FIXED	0.00	25	360	800	80
Fix30 730	100.00	3.809	FIXED	0.00	25	360	730	80
Fix30 690	100.00	3.986	FIXED	0.00	25	360	690	80
Fix30 670	100.00	4.200	FIXED	0.00	25	360	670	80
Fix30 650	100.00	4.630	FIXED	0.00	25	360	650	80
Fix30 630	100.00	5.176	FIXED	0.00	25	360	630	80

Numerical Example

The yield attribution decomposes the loan yield into the appropriate discount rate for the loan weighted average life (time value), the spread pays for the prepayment option of the borrow (option spread), the discount for the credit risk (similar to the expected loss rate after adjusting for the recovery ratio), and the clean OAS (the net profit expected to be released annually). The results are provided below for the sample loans

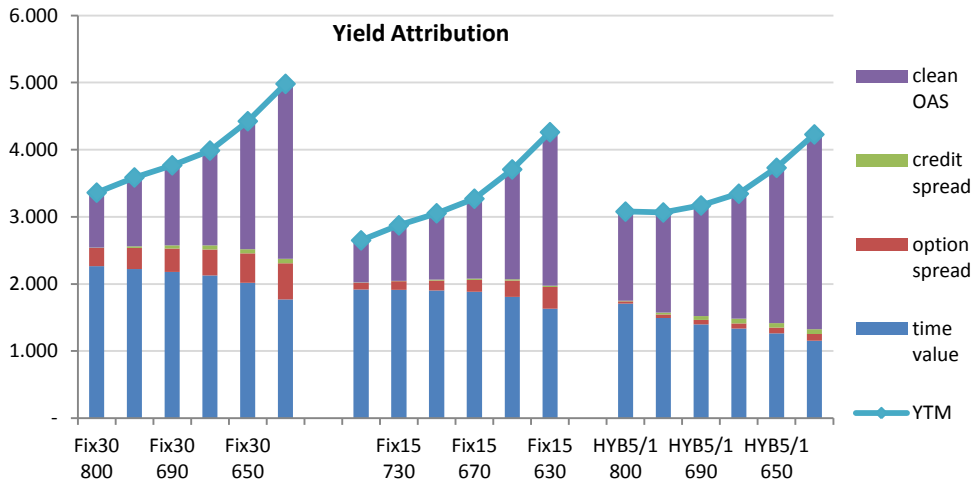
YTM	Yield Attribution(%)				Interest Rate Risk		CECL
	time value	option spread	credit spread	clean OAS	eff.dur	eff.conv	
[1]=[2]+[3]+[4]+[5]	[2]	[3]	[4]	[5]			
3.361	2.265	0.271	0.007	0.818	6.08	-2.78	0.031
3.588	2.223	0.313	0.024	1.028	5.90	-2.28	0.090
3.769	2.180	0.344	0.048	1.196	5.80	-3.28	0.163
3.988	2.125	0.388	0.060	1.414	5.56	-1.08	0.187
4.426	2.017	0.438	0.064	1.907	5.79	-1.23	0.178
4.982	1.769	0.541	0.066	2.607	5.46	-1.53	0.170

- Lower credit quality leads to shorter weighted average life. Given the current upward sloping yield curve, the discount rate is therefore lower. The time values are 1.769% and 2.265% for FICO 630 and FICO800 respectively.
- The premium higher for lower credit quality loans. The clean OAS are 2.607% and 0.818% for FICO 630 and FICO800 respectively



- Eff. Conv is the effective convexity measuring the prepayment risk: lower the convexity number higher is the prepayment risk. Consistent with the discussion above, FICO 800 has higher prepayment risk
- The model can determine the present value of expected loss for the life the loan, CECL, which is reported here.

A graphic depiction of yield attribution is given below:



These results enable you to focus on the Clean OAS as a measure of value, weighing the income (the clean OAS percent of the outstanding amount) against the credit risk. This measure may be used by you to identify loans to be sold, bought or originated.

A more detailed analysis is also available on the Thomas Ho Company Ltd homepage www.thomasho.com under Risk Table.



Conclusion

Credit risk affects loan pricing and your ALCO decisions in many ways. Yield attribution and the clean OAS measure can be useful decision support tools for you to

- sell some loans to investors based on the loans' credit exposure,



- evaluate the credit analysis of the loans in a more granular level per Current Expected Credit Loss (CECL) guidance,
- buying loan pools from another bank,
- evaluating the loan pricing in origination.

Please do not hesitate to contact THC staff if you have any questions on regarding the credit risk, interest rate risk or pricing of your residential mortgage loan portfolio

Regards

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