



September 22, 2015

Weekly Post: Mortgage Servicing Right: Valuation and Risk Analysis

Dear Clients-

Mortgage servicing rights (MSR) occur when a mortgage is sold into the secondary markets. Many institutions sell the mortgages they issue, but retain the servicing fee, thus the MSR. This fee is typically 25 basis points of the outstanding amount of a mortgage loan. Thus we may have a portfolio of mortgage servicing right (MSR) on our balance sheet and this can result in significant service revenue over the life of the loan. This MSR portfolio is valued and its interest rate risk is analyzed in the Economic Value of Equity report.

MSR cannot be treated as a simple cash flow and the value and risks cannot be determined by a simple discount cash flow method, because the MSR risk characteristics are complex. Your MSR portfolio may affect the aggregate risk exposure of the balance sheet, and hence the balance sheet management strategy along with your budget planning.

Analyses of the MSR portfolio enable us to

- determine whether to retain servicing when reviewing an acquisition or sale decision of loan pool;
- determine your bid/ask prices in a loan transaction;
- manage the interest rate risk of an MSR portfolio and understand its impact on the balance sheet and duration,

Challenge

The fee income of a fixed rate mortgage value is sensitive to a number of factors and the value of the MSR portfolio is inversely correlated to the interest rate direction. When interest rate rises, the prepayment speed of the mortgage loan slows, resulting in a lengthening of the weighted average life of the fee income stream. Therefore the MSR portfolio value would increase. Conversely, if interest rates fall, the loan may be expected to prepay sooner, shortening the fee income stream, resulting in lowering the MSR portfolio value. Higher interest rates would result in a higher discount rate, and therefore a lower value

- How to value an MSR portfolio taking all these factors into consideration?
- How can we measure the risks of such servicing fee? Can we hedge the risks?

Solutions



A financial model based on a “stochastic interest rates”, as described by regulators, has to be used. Such an approach can be summarized by the following steps:

1. Use market prices (or rates) to determine the yield curve and use over 100 swaption prices to the market perception of interest rate uncertainties, as measured by implied volatilities.
2. Generate many interest rate scenarios and simulate the income fees of each MSR for each interest rate scenario, and determine its discounted present value.
3. The value of an MSR is the average of these present values. The MSR portfolio value is the sum of the fees of all the loans. For each interest rate shock, the model repeats all the calculation based on the shocked yield curve

Analyzing an MSR portfolio requires intensive computations and complex financial modeling, and the valuation cannot be simply discounting an MSR cash flow.

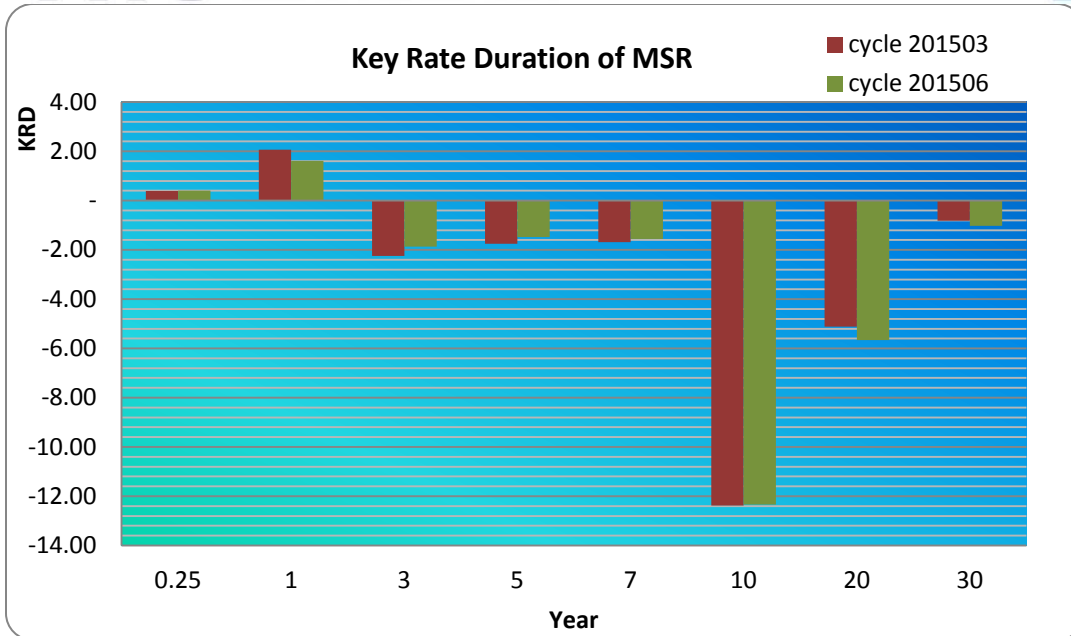
Numerical Example

The following simulation from **Risk Officer** shows the risk of a 30yr FRM MSR for both 03/06 and 06/06 cycle. The TABLE below describes the underlying loans and the servicing fee. Loan level information is used and the following items are used to model prepayments

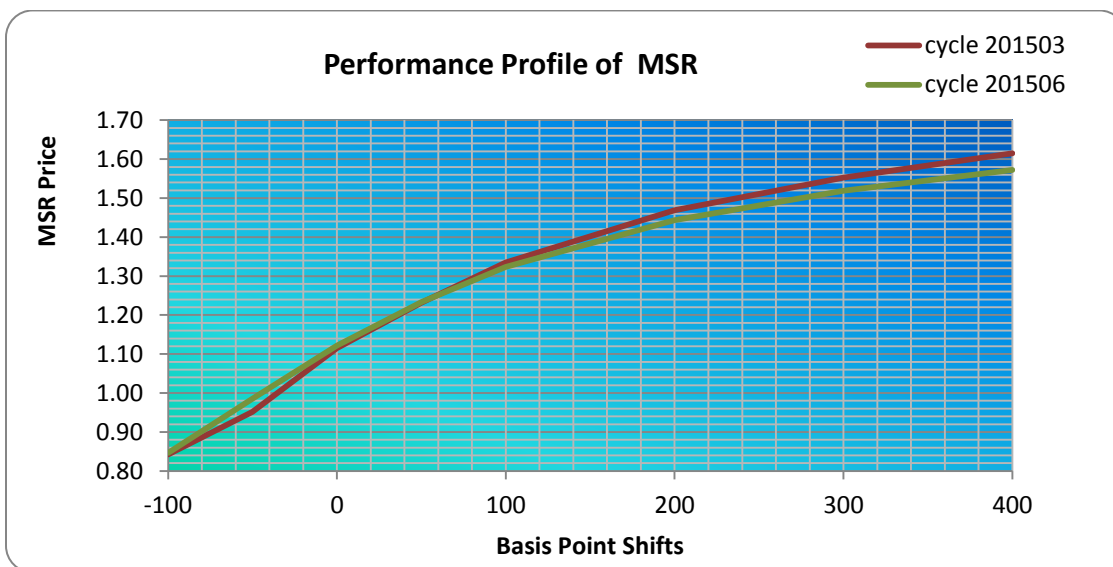
- loan type
- size
- remaining life
- FICO score
- LTV
- specific fees (late charges, ancillary income, foreclosure and acquisition cost)
- P&I float items and T&I float items are used for valuation.

Loan Size	Loan Rate	Origination	Maturity	FICO	LTV	Servicing Fee
250,000	4.75%	3/31/2015	3/31/2045	720	75%	0.25%

Figure 1 reports the key rate durations (value sensitivity to each key rate) of the MSR 1503 and 1506 cycles. The result shows that the MSR value falls significantly when the 10 or 20 year rate falls. The change in the shape of the yield curve also affects the value because the loan prepayment is mostly affected by the longer term rates. An MSR portfolio has a negative duration, as opposed to a positive duration that most balance sheet items have.



The performance profile depicts the MSR value over a range of rate shocks in Figure 2, it depicts the dramatic impact on the MSR value in a falling interest rate scenario. Also, the results show that the change in weighted average life over a time period can also affect the MSR value.



Conclusion

MSR portfolio is interest rate sensitive. An MSR portfolio lowers the balance sheet duration (risk exposure to rates rising). An estimated value of MSR enables us to decide on the merits in a loan portfolio sale or acquisition.



THC provides monthly MSR portfolio valuation service. Please do not hesitate to contact THC staff if you have any questions on regarding MSR portfolio valuation. A sample MSR report is available in Risk Officer.

Regards,

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