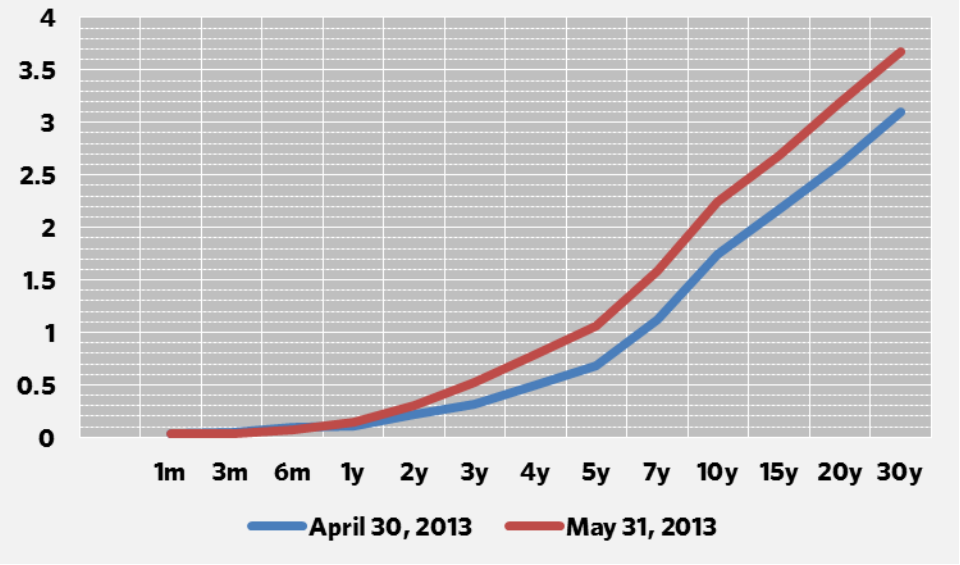
Performance of MBS: ARMs vs FRM

The yield curve steepened significantly in the month of May (see Figure 1) and that affected the performance of adjustable rate mortgages (ARMs) and fixed rate mortgages (FRMs) differently. Not only FRM is exposed to higher duration risk (parallel shift of the yield curve) but also different non-parallel yield curve risks (steepening and curvature of the yield curve) relative to the ARMs. As the yield curve may poise to start a rate rising and steepening regime, understanding the driving forces that affect the ARMs and FRMs total return is more important now for investment, portfolio revision and loans originations.

Figure 1 | Treasury Spot Curves April and May



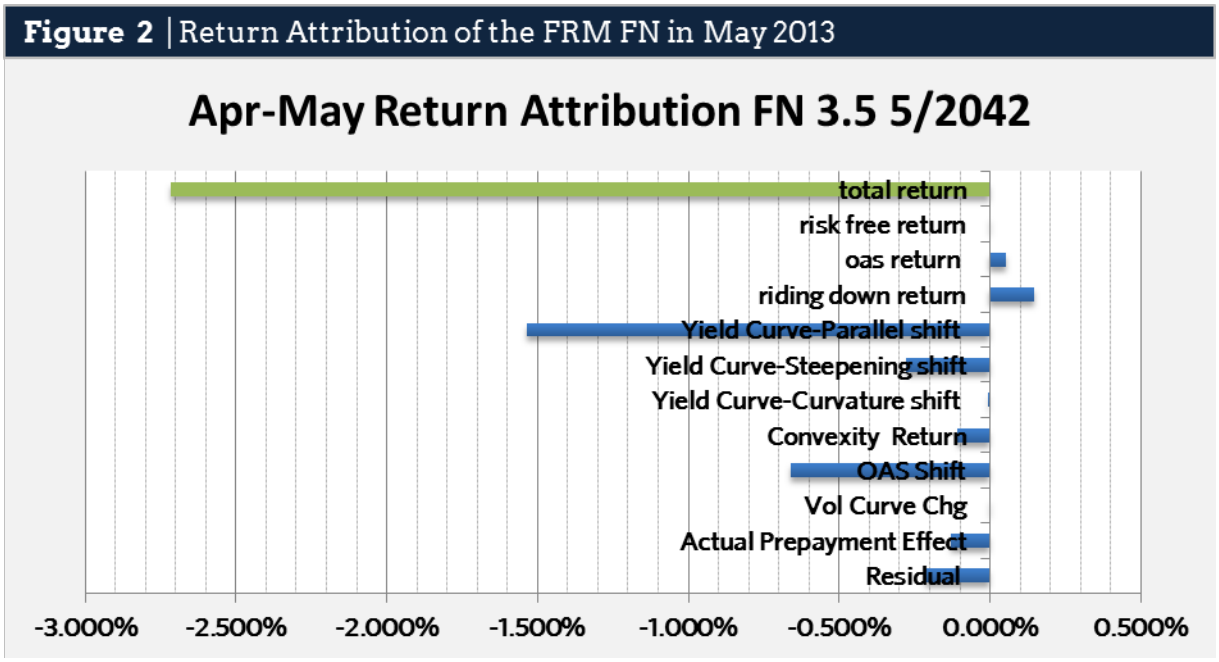
For illustration, let us consider the total returns of a 30 year fixed rate FN 3.5 5/2042, 3138EETL3 and an ARM FN 2.86, 10/2035, 31413NV69. The bond analytics are presented in Table 1. Both MBSs are trading at significant premiums with similar long maturities. The FRM has a higher option adjusted spread (OAS) of 66 basis points, while the ARM has 29 basis points. As expected, FRM has a higher duration of 4.12 year while the ARM has a duration of only 0.89 years. That is, the FRM is exposed to higher interest rate risk when the yield curve makes a parallel upward shift. But we will show that the FRM is exposed to other risks as well.

Table 1 | Risk Exposure of the MBS

	coupon rate	maturity	hybrid type	index	margin	market price	YTM	OAS	eff duration
FN FRM	3.5	28.83				106.7	2.3	0.7	4.12
FN ARM	2.86	24.5	5/1	1 YEAR LIBOR	174	107.5	1.7	0.3	0.89

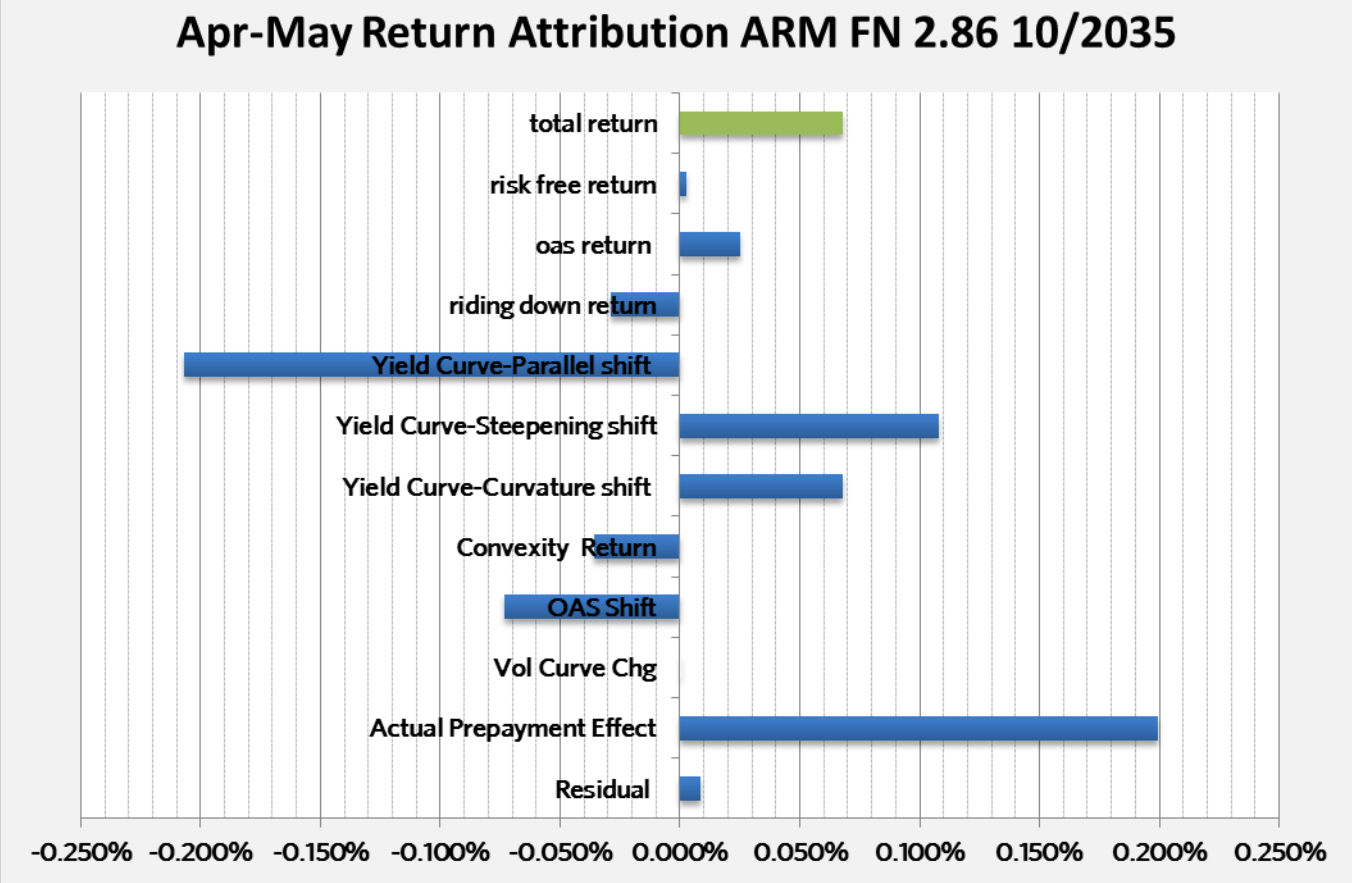
To determine that risk drivers of the MBS, we consider the attribution of the total returns of the MBS in Figure 2 and Figure 3 respectively. These return attribution results breakdown the observed total returns into their components, and thus identifying all the factors that affect the bond returns. Further, these results highlight the main contributors of the profit or loss of the MBS.

Figure 2 | Return Attribution of the FRM FN in May 2013



The results show that the FRM lost over 2.7% in the month of May, with the yield curve risks contributing 1.8%. The remainder of the loss for the most part is attributed to the widening of the option adjusted spread, resulting in 0.65%. By way of contrast, let us consider the return attribution of the ARM over the same period.

Figure 3 | Return Attribution of the ARM in May 2013



The results on the ARM are quite different. The ARMs has a profit of 0.06%. While the parallel shift of the yield curve and the widening of the OAS led to loss of over 0.28%, the yield curve movement gains 0.176% and the prepayment speed was slower than expected leading to another 0.2% gain.

Most Important Contributors to Total Returns

- As expected, the parallel shift of the yield curve was the most significant factor that led to the losses of the bonds. But for the ARMs, the steepening of the yield curve led to a gain, mitigating the losses from much of the rise of the yield curve.
- In May 2013, when interest rates rose, the OAS widened, leading to losses in both cases, but it affected the FRM more significantly. The OAS shift can also be an important factor.

Conclusions

ARMs can benefit from a steepening of the yield curve, an attribute that is often over looked.

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Contact us if you have any questions, suggestions or comments. What would you like us to discuss in coming issues? We look forward to hear from you.

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Thomas S.Y. Ho PhD, President of THC, senior consultant to federal regulatory agencies and senior consultant to enterprise risk management departments of largest financial institutions 1999-2005.; elected member of the US Financial Economists Roundtable; Board member of the Finance Mathematics Program, Courant Institute of Mathematics, New York University; Research Professor at Owen School of Business, Vanderbilt University; nomination committee IAFE financial engineer of the year. He was named one of the most prolific authors in finance based on a study by Cooley and Heck, (Journal of Finance, 2003). Author of the Ho-Lee model (the first arbitrage-free stochastic interest rate model) and key rate durations (the widely used interest rate risk measure for over $12 trillion assets.). Associate Editor of Journal of Derivatives and Journal of Investment Management; co-authored four books and has published in major journals including Journal of Finance, Journal of Derivatives, Journal of Fixed Income, and Journal of Portfolio Management. Books include The Oxford Guide to Financial Modeling, Strategic Fixed Income Investments, Securities Valuation. Received his Ph.D. in Mathematics in 1978 from the University of Pennsylvania, New York University's Stern School of Business as Professor of Finance from 1978 until 1990; full professor in 1985.