THC Financial Engineering
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Risk Modeling Bulletin Issue 14

Option ARMs

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Option ARMs are recent financial innovations in the mortgage market. The Feature Article of this issue describes such a mortgage and shows the cash flows projected by THC model. Market Perspective provides the valuation of the option ARMs and their durations.

Feature Article: Option ARMs Cashflows

An option ARM is an adjustable-rate mortgage with added flexibility for choosing one of several possible monthly payments options, in order to serve the mortgagor with better managed monthly cash flow. Generally, there are four major types of payment option: minimum payment, interest-only payment, fully amortizing 30-Year payment and fully amortizing 15-Year payment.

With an option ARM, there is an introductory period (3 months for a 3-month option ARM, for example), during which the interest due is calculated at the initial interest rate, always a very low fixed rate. Thereafter, interest will be calculated at the Fully Indexed Rate (=Index + Margin).

With the minimum payment option, the monthly payment is set for the initial 12 months at the initial interest rate. When the minimum payment is lower than the interest due, deferred interest will be added to principal, resulting in "negative amortized principal". However, the remaining principal cannot be more than a fixed multiple of the initial balance, which is called the negative amortization cap. The minimum payment resets annually unless the negative amortization cap is reached to avoid significant negative amortization. But the maximum payment change is limited to a fixed fraction (the payment cap) for each reset. Another way of avoiding significant negative amortization is recast, which is done every five years unless a negative amortization cap is reached. Once the negative amortization cap is reached, the minimum payment will be recast immediately.

With the interest-only payment option, one can avoid negative amortization by paying interest due when the minimum payment is lower than the interest due. Note that interest-only payment is unavailable when it is lower than the minimum payment.

Figure 1 depicts the cashflows of the 3-Month option ARM described in Table 1 under the assumption that mortgagors will always pay the minimum payment due. Minimum payment decomposition is depicted in Figure 2.

TABLE 1: A 3-Month Option ARM

Start Date	Maturity	Balance($'000)	Index	Margin(%)	OAS(%)	LifeCap(%)
2006-6-1	2036-6-1	200	1-Year CMT	2.75	0.50	12.00
Minimum Payment						
Initial Interest Rate(%)		**Minimum Payment($'000)**		**Payment Cap(%)**		
3.00		0.500		7.50		
Initial/ Subsequent Reset(month)		**Initial/ Subsequent Recast(month)**		**Negative Amortization Cap(%)**		
12/12		60/60		110.00		

The minimum payment remains unchanged for one year and then increases/decreases in steps, in response to the annual reset. A decrease at each 5 years' end is the result of recast.

FIGURE 1

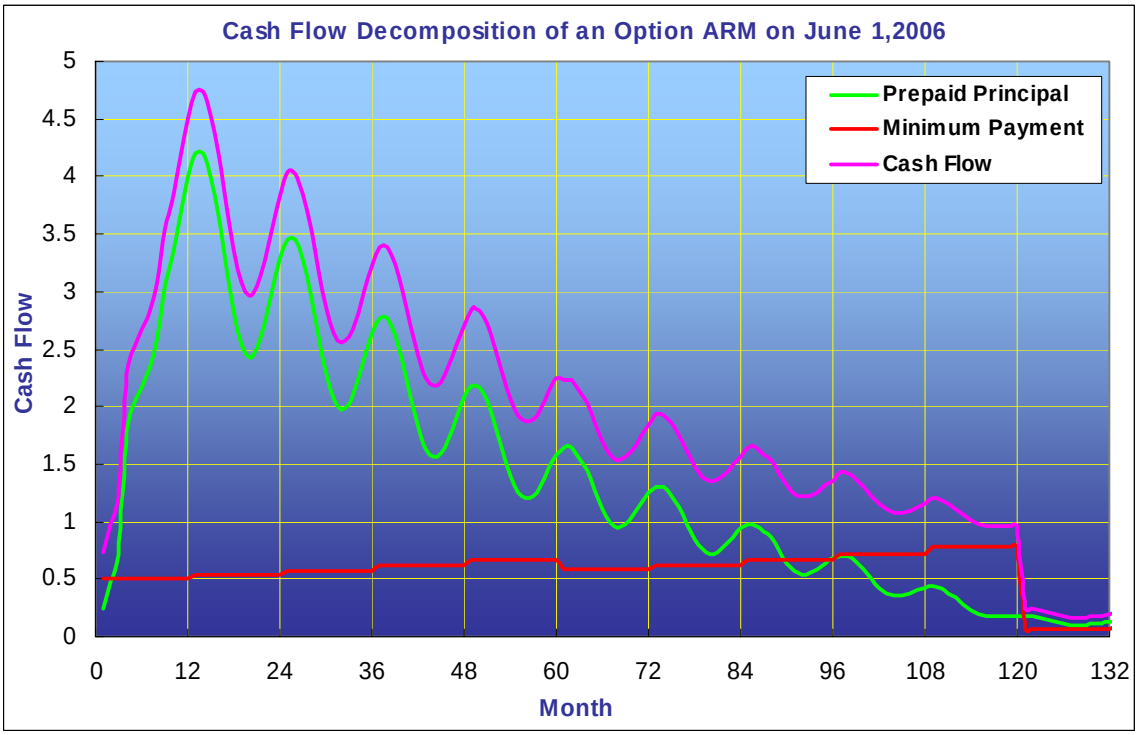


FIGURE 2

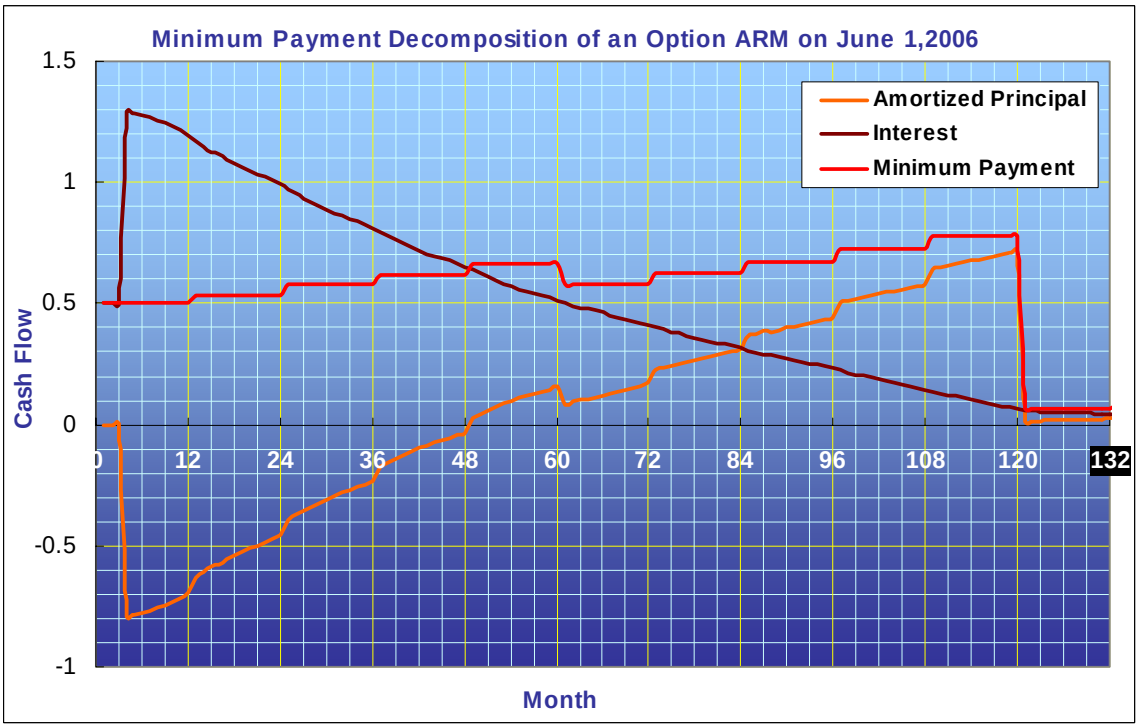
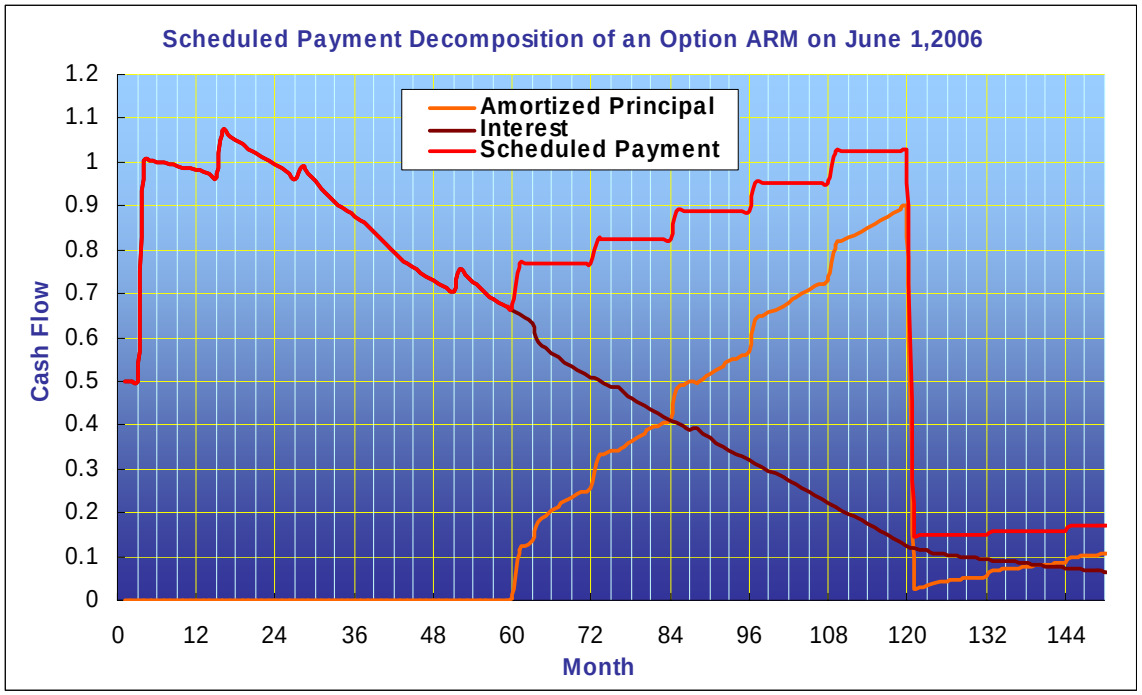


Figure 3 depicts the scheduled payment decomposition of the option ARM under the assumption that the mortgagor will pay the higher of the minimum payment and the interest-only payment. Negative amortization will be completely avoided, as seen clearly from Figure 3.

FIGURE 3



Market Perspective: Option ARMs Valuation

Given a set of interest rate scenarios, we can generate the corresponding cashflows of the option ARMs. The value of the option ARM is the weighted average of the present values of these cashflows. Figures 4 and 5 depict the performance profile and key rate durations of the option ARM described in Table 1 (of part 1) under the assumption that mortgagors will pay the minimum payment or interest-only payment to avoid negative amortization. The option ARM performance profile shows that the mortgage declines in value with a rise in interest rates, and that it is significantly exposed to the 5-year interest rate risk.

FIGURE 2

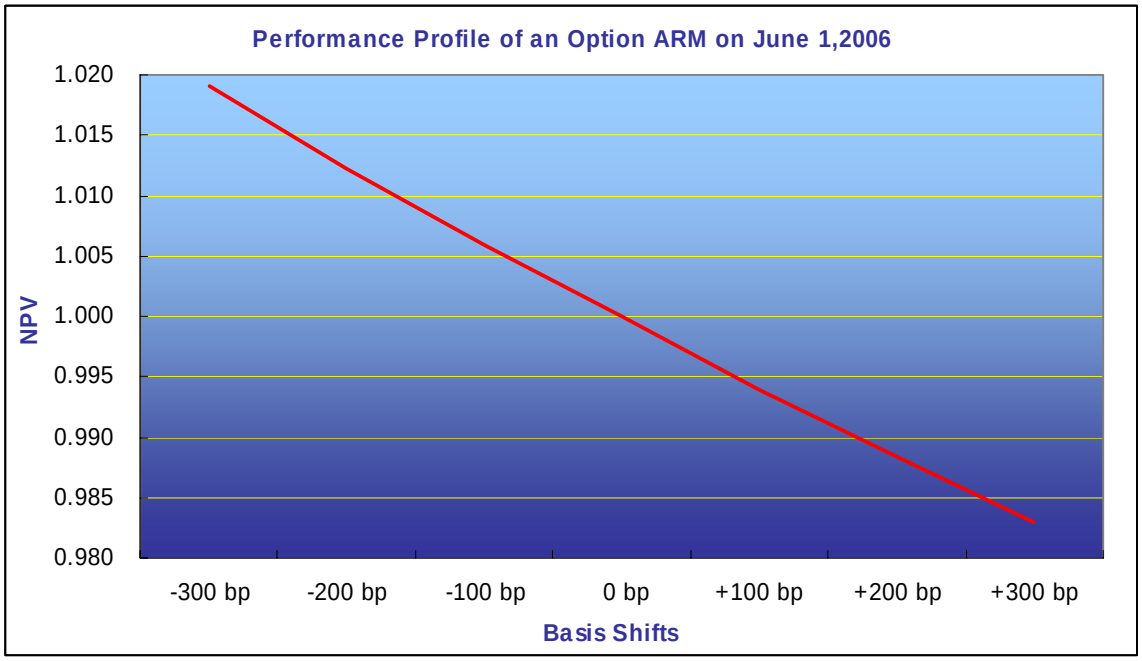
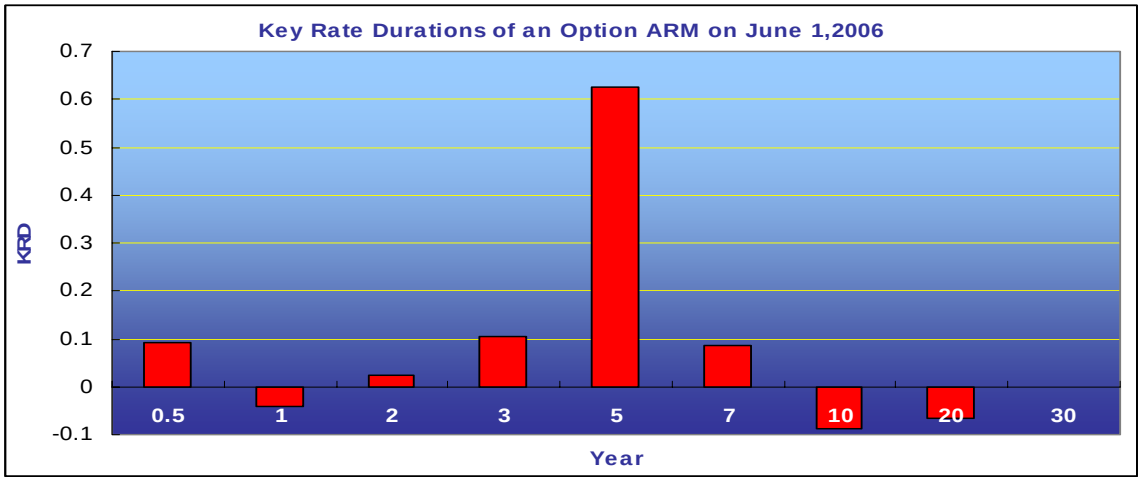


FIGURE 3



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Contact us if you have any questions, suggestions or comments

support@thomasho.com Voice: 1-212-732-2878 Fax: 1-212-608-1233
Http://www.thomasho.com 55 Liberty Street, 4B, New York, NY 10005-1003 USA