

Valuation Consequences of the New ARM Prepay Model

Part II: Non-Agencies get their own portraits

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Version 5.2a features two non-agency ARM models, a non-agency prime model, and a sub-prime model. These models have been built using our unified framework. Much like their agency counter-parts, they are designed within the APD structure, 4 sources of prepayments (turnover, refinancing, cashout, and cure) and the same set on tuning knobs. The SATO effect plays a prominent role in our sub-prime model whereas the weighted average original loan size (WAOLS) and weighted average original LTV (WAOLTV) are the corrective factors of refinancing, turnover and cashout speed multiples. It is clear that it is impossible to compare fairly prime and sub-prime instruments without accurate assessment of their credit differences. In this short article, we review valuation aspects of non-agency prime ARMs and sub-prime ARMs as a consequence of the prepayment behavior.

Jumbos are faster, but not cheaper

Prime fixed-rate borrowers of jumbo size tend to exercise refinancing option more efficiently. Although a same-OAS or same-Price valuation exercise can be carried out with ease, the most popular task in the primary market is to compute a well-defined rate spread offered to jumbo borrowers. This important practical measure facilitates lending of jumbo loans based on the difference in exercise efficiency (given similarly adjusted credit) as captured by prepayment model. In particular, we may start with comparing jumbos and agencies having same coupons and GWACs; this modeling setup adjusts jumbo ARMs's credit to that of agency ARMs (assuming there is no difference in credit of the underlying loans).

To illustrate the solution, we first measure the current coupon rate; on September 22, it was close to 5.5 for the Fannie Mae 5/1 with the 2/2/5 caps. Using the market price of 100-04 and our new agency hybrid model, we compute LOAS of 20.7 bps. We now fix this LOAS and employ it for all calculations for non-agency prime ARMs. For each combination of WAOLS and WAOLTV, we can iterate for GWAC until the same price are achieved as in the agency case.

This modeling exercise results in a somewhat counter-intuitive finding: same-OAS, same-Price GWAC is lower for jumbo ARMs than for agency ARM, by 5-15 bps. In other words, jumbo hybrids should be richer, not cheaper, than their agency peers. The explanation for this seemingly paradoxical result is that jumbo ARM prepayments are faster, for all coupons and incentives. The overall acceleration reduces the time value of all the embedded options (including caps) and, hence, the overall option cost. As for the loan features (loan size, LTV), we find them to play a rather marginal role in the jumbo values.

The sub-primes fair well

The new non-agency sub-prime ARM model heavily relies on spread-at-origination (SATO) factor. Prepayments are still interest rate dependent (albeit to a smaller extent to the prime ARMs), but this dependence comes with a smirk: lowering market rates by 100 bps have an

incomparably stronger prepayment effect to rising coupon (and GWAC) by the same amount. Since SATO is employed both in refinancing incentive and credit impairment, the resultant prepay pattern becomes much less dependent on the original coupon.

On a pure prepayment basis (without consideration of losses and difference in margins, i.e. zero-SATO), sub-prime ARMs are better-behaving, value-adding, instruments than agencies. For a hypothetical 3/1 sub-prime 6.5% hybrid (usually called “3/27”; most sub-prime hybrids have 2-yr or 3-yr intro periods), this favorable pattern translates into a 1.0 point pay-up to the agency (0.5 point for 5.5%). Each \$100K increment in loan size reduces the value by 0.08-0.12 point. Effective duration’s extension is sizable: 0.8 yr for 6.5 and 0.5 yr for 5.5. With the original GWAC rising, refinancing ability of sub-prime borrowers saturates and effective convexity becomes positive.

On a full-value basis, an approximate relative value exercise can be carried as follows. Fix an agency coupon rate (let it be 5.5, GWAC = 6.0, LIBOR + 175) and compare to a family of sub-prime ARMs with various SATO levels. For example, SATO = 1 means a 6.5 coupon, 7.0 GWAC and a 275 net margin. Furthermore, we should add 100 bps to OAS to account for the credit difference. Results are summarized in Table 1.

Table 1. Relative valuation of sub-prime 3/1 (3/27) hybrids

GWAC	Coupon	Net Margin	SATO	Loan Size	LOAS	Differences to 5.5% 3/1 FN ARM					
						Age = 0			Age = 12 mo		
						Price	OAD	CC CPR	Price	OAD	CC CPR
6.0	5.5	175	0	300,000	20	0.44	0.56	-7.7	-0.06	0.03	0.6
6.0	5.5	175	0	200,000	20	0.52	0.59	-8.5	0.00	0.05	-0.5
6.0	5.5	175	0	100,000	20	0.60	0.62	-9.2	0.07	0.06	-1.5
7.0	6.5	275	1	300,000	120	0.30	0.51	-5.3	-0.19	0.01	2.7
7.0	6.5	275	1	200,000	120	0.37	0.54	-6.2	-0.13	0.03	1.5
7.0	6.5	275	1	100,000	120	0.45	0.57	-7.1	-0.06	0.05	0.3
8.0	7.5	375	2	300,000	220	0.27	0.49	-5.5	-0.04	0.17	-1.6
8.0	7.5	375	2	200,000	220	0.34	0.53	-6.4	0.02	0.18	-2.5
8.0	7.5	375	2	100,000	220	0.42	0.56	-7.2	0.08	0.19	-3.3
9.0	8.5	475	3	300,000	320	0.58	0.71	-9.4	-0.04	0.19	-2.3
9.0	8.5	475	3	200,000	320	0.64	0.73	-10.0	0.01	0.20	-3.1
9.0	8.5	475	3	100,000	320	0.70	0.75	-10.5	0.07	0.21	-3.9

The top panel examines zero-SATO pools, those we analyzed in the beginning of this section on a pure prepayment basis; the highest SATO pools are shown at the bottom. It seems that newly originated sub-prime ARMs offer some positive pay-up to the agency benchmark, for any SATO level. The cause of this pay-up is a slower prepayment ramp; the benefit dissipates within 12 months of aging.

IOs, penalties and the bridge to option ARMs

Interest-only (IO) loans have become popular in the agency universe; prepay penalties are common in sub-prime loans. Our relative valuation tests for various-SATO sub-prime pools shows that the IO feature is not a heavy factor, but the penalty is (Table 2).

Table 2. Relative valuation of new sub-prime 3/1 (3/27) hybrids with 3-yr IO and penalty

GWAC	Coupon	Net Margin	SATO	Loan Size	LOAS	Differences to usual sub-prime		
						Price	OAD	CC CPR
6.0	5.5	175	0	300,000	20	0.35	0.24	-3.1
6.0	5.5	175	0	200,000	20	0.35	0.23	-2.8
6.0	5.5	175	0	100,000	20	0.34	0.22	-2.6
7.0	6.5	275	1	300,000	120	0.26	0.15	-3.9
7.0	6.5	275	1	200,000	120	0.26	0.14	-3.6
7.0	6.5	275	1	100,000	120	0.26	0.14	-3.3
8.0	7.5	375	2	300,000	220	0.13	0.07	-2.2
8.0	7.5	375	2	200,000	220	0.14	0.06	-2.1
8.0	7.5	375	2	100,000	220	0.14	0.06	-1.9
9.0	8.5	475	3	300,000	320	0.05	0.03	-0.1
9.0	8.5	475	3	200,000	320	0.05	0.03	-0.1
9.0	8.5	475	3	100,000	320	0.05	0.03	-0.1

As seen from Table 2, penalty can be worth up to one-third of a price point as it slows the life speed of new hybrids by as much as 3 CPR. The benefit of penalty vanishes with original GWAC, i.e. SATO. The most plausible explanation is high-SATO loans have trouble refinancing as a penalty for having low credit; the presence of formal refinancing penalty may not alter their valuation angle much. Like in the agency case, sub-primes carry various provisions for non-penalized actions, moving out or curtailing, thereby making the life speed fairly high (25-30 CPR).

The new suite of models does not have option ARMs explicitly presented; in the future releases, we expect to cover this sector. In the meantime, we think they can be approximated by a combination of IO and penalty features. As was shown in a recent presentation by L. Goodman of UBS, option ARMs' average credit score (708 -710 for 2005-06 origination) is close to that of average sub-prime ARMs'; they have a large percentage of prepay penalty loans; their cashflow pattern is somewhat uncertain, but resembles that of IO loans with pay reset caps and depressed refinancing and.

Therefore, valuation effect of option ARMs is somewhat similar to adding an IO, a penalty, and a pay reset cap to a lagging-index ARM. For low-SATO pools, we estimate option ARM pay-up over similarly-indexed COFI ARM as 0.3-0.4 point (36 months option), or 0.4-0.5 points (60 month option), see Table 3.

Table 3. Relative value of option ARMs

	SATO	Differences to same-rate COFI		
		Price	OAD	CC CPR
36-mo option	0	0.39	0.18	-3.6
60-mo option	0	0.54	0.26	-5.3
36-mo option	1	0.29	0.08	-3.4
60-mo option	1	0.37	0.12	-4.5
36-mo option	2	0.15	0.01	-2.0
60-mo option	2	0.18	0.02	-2.5

As in the case of other sub-prime ARMs, the higher SATO a pool has, the smaller the benefit of the option is. These estimates should be revisited after AD&Co once a true option ARM model is developed.

Dan Szakallas (part 1) and Sanjeeban Chatterjee (part 2) have contributed to this article.