

Non-Agency Hybrids: A Primer

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INTRODUCTION

The non-agency hybrid ARM market dates back to the early 1990s. However, non-agency hybrids have been securitized in force only in the past two years, as hybrids have historically sat in bank portfolios in whole-loan form. Over the past two years, though, a steep yield curve environment, the growing popularity of these loans among borrowers, new securitization structures (e.g., hard takeout at the reset date), and greater capital markets acceptance of hybrid ARMs have caused securitization volume to grow explosively (Figure 1). While 2000 saw only \$4.5 billion in securitizations, 2001 issuance reached \$28 billion, and 2002 issuance reached over \$65 billion. As a percentage of the entire non-agency market, hybrids have gone from being 10% to 22% to 36% over the same period. Longer term, issuance of ARMs is most correlated with the shape of the yield curve, both in the non-agency and agency markets (Figure 2). We expect 2003 non-agency issuance to remain robust: assuming fixed rate origination of approximately \$120 billion, hybrids should see roughly \$70-\$80 billion in new issuance.

The purpose of this piece is to provide an overview of the non-agency hybrid ARM market. We review the structural innovations, as well as the different types of cap structures, the prepayment characteristics of the sector, and its credit performance versus fixed-rate prime mortgages. We also discuss “tail” valuation and outline an OAS framework for evaluating differences between jumbo hybrids and other collateral and amortization types. Our conclusions are:

- Jumbo hybrid ARMs, the dominant portion of the non-agency hybrid market, have borrower characteristics broadly similar to fixed-rate jumbo borrowers, with the exception of somewhat larger loan sizes and higher California concentrations.
- Jumbo hybrids have faster current coupon prepayments than fixed rate jumbos. Credit performance is very similar to that of fixed rate pools.
- A growing part of the sector, alt-A hybrids were about 15% of the non-agency hybrid issuance in 2002. As with fixed-rate jumbo alt-As versus fixed-rate jumbos, jumbo alt-A hybrids display weaker credit characteristics than jumbo hybrids, such as lower FICO scores and higher percentages of non-owner occupied properties, limited documentation loans, and cashout refinancings. The convexity characteristics of jumbo alt-A hybrids also benefit from a high percentage of prepay penalty loans.
- Hybrid securitizations incorporate some unique structural features versus fixed-rate securitizations, such as a mandatory auction call at the roll date. However, even in securitizations without a mandatory call, the tail of the security is likely to be worth more than par, allowing investors to replicate the economics of the call through security sales.

- Premium jumbo hybrids are an attractive short duration asset, with \$101 securities offering OAS of approximately LIBOR + 60 bp. Additionally, these securities have limited extension risk, due to the ability to terminate the cash flows at roll.

HYBRID ARM TERMINOLOGY

As the name suggests, a hybrid ARM combines elements of a fixed- and an adjustable-rate loan. The loan has an initial period during which the borrower pays a fixed rate (the teaser rate) and a second period during which the borrower pays a floating rate based on a pre-determined spread off of an index, typically resetting yearly. While the loan generally has a 30-year amortization term, the initial rate is below the 30-year fixed mortgage rate. The initial period varies-typically 3, 5, 7, or 10 years-and the different mortgage programs are usually referred to as 3/1s, 5/1s, 7/1s, and 10/1s. The non-agency hybrid market has principally consisted of 5/1 and 3/1 ARMs. Historically, hybrid loans have attracted borrowers with shorter horizons and borrowers who want

Figure 1. Non-Agency Hybrid ARM Sector Sees Tremendous Growth

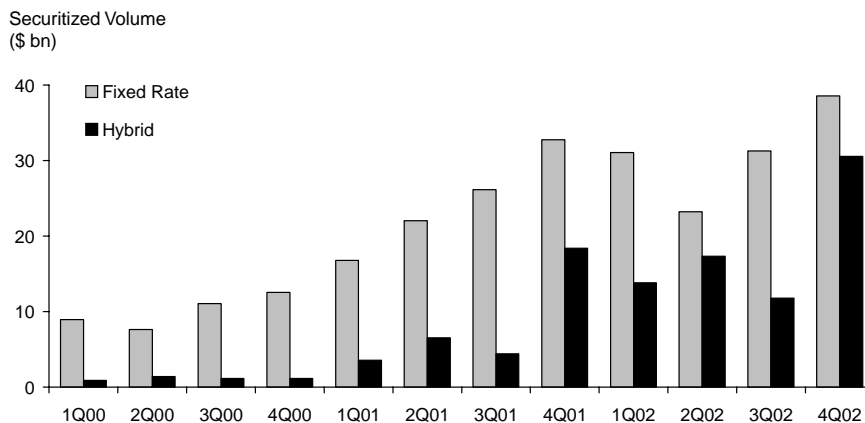
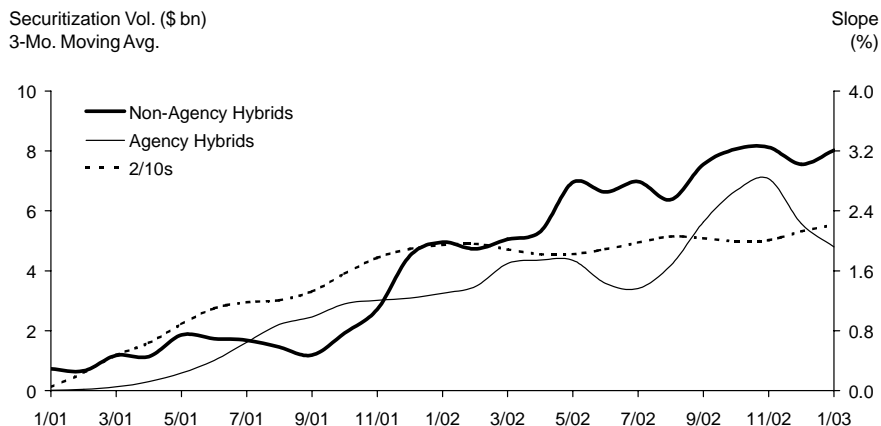


Figure 2. Issuance Tracks the Slope of the Yield Curve



to take advantage of the lower rates offered during the fixed-rate leg relative to a 30-year fixed-rate loan. Payments on the floating-rate portion of the loan, also referred to as the tail, are based on an index, most often 1-year CMT or 6-month/1-year LIBOR.¹ In practice, the market has seen a shift toward more LIBOR-indexed deals. In 2001, hybrid ARM issuance was relatively evenly divided, with 44% of issuance based on 1-year CMT and 56% of issuance based on 1-year LIBOR. In contrast, LIBOR-based deals composed 72% of 2002 issuance. This shift in index type has largely been driven by the discontinuation of the 1-year T-bill, as well as investor desire to minimize basis risk versus LIBOR, which is the natural funding index.

The homeowner's rate is based on the index rate observed a specified number of days before the reset date (the look-back period). The total (gross) margin paid by the borrower is the spread above the index during the floating-rate period. The net margin is the coupon over the index that is actually passed through to bondholders. It is equal to the gross margin paid by the borrowers minus servicing and other deal fees. The adjustable portion is subject to three types of interest rate caps: the initial, the periodic, and the lifetime cap. The initial (first) cap is the maximum amount that the rate can reset upward on the first reset date (also called the roll date). Periodic caps limit the change in the coupon payment on all following reset dates. The lifetime cap places a maximum on the coupon payment at any point in the loan's existence. The minimum coupon payment, or the floor, is the margin. Figure 3 summarizes typical cap structures by program type. These caps have implications for tail valuation, which we discuss later in the piece.

COLLATERAL CHARACTERISTICS

As in the fixed-rate market, the prime hybrid market is separated into jumbo and alt-A collateral. The hybrid market is, however, dominated by "clean" (non-alt-A) jumbo loans, with issuance in hybrid alt-As less than 15% of that in jumbos. We focus on 5/1 hybrids for comparative purposes, since most of the collateral lies in this program type, and outline the main characteristics in Figure 4.

¹ Other, less common indices include the CD index and the monthly 11th District COFI.

Figure 3. **Cap Structure Summary***

Program Type	First Reset (bp)	Periodic Reset (bp)	Lifetime Reset (%)	Notation
3/1s**	200	200	6	2/2/6
5/1s	500	200	5	5/2/5
7/1s	500	200	5	5/2/5
10/1s	500	200	5	5/2/5

* Most often the first and periodic caps are quoted in bp while the lifetime cap is quoted in %.

**3/1s are also commonly structured as 2/2/5.

As can be seen in Figure 4, jumbo 5/1s have credit characteristics that are broadly similar to those of fixed-rate jumbos: average FICO scores are approximately 730, with about 5% of loans scoring below 650, while average LTVs are 68%, with a small percentage (3%) with LTVs above 80%. Additionally, cash-out percentages are similar across the two loan types (~20%), though limited documentation loans are somewhat more common in jumbo 5/1s than fixed-rate jumbos. In terms of geography, hybrids tend to have high (~65%) California concentrations versus fixed-rate collateral (45-50%). This is explained in part by the higher home prices in California relative to other parts of the country, which creates a greater incentive for liquidity constrained borrowers to take the low initial rate associated with hybrids; hybrid loan sizes are, in the aggregate, 10%-15% greater than jumbo loan sizes. Secondly, many of the largest issuers of hybrid ARM loans such as Bank of America and Washington Mutual enjoy a wide West Coast retail presence.

The difference between fixed and hybrid loan characteristics is more pronounced on the alt-A side. While both fixed and hybrid alt-As have high (65%-70%) percentages of limited documentation loans, alt-A hybrids tend to have better credit characteristics than fixed rate alt-As: FICO scores are higher, the percentage of FICOs less than 650 is lower, average LTVs are lower, and the percentage of high (>80%) LTV loans is lower. Jumbo alt-A hybrids also have much larger loan sizes (\$538K for 2002 originations) than fixed rate jumbo alt-As (\$438K for 2002 originations), and, in fact, have larger loan sizes than jumbo hybrids (\$469K). However, alt-A hybrids tend to have higher cash-out refinance percentages than fixed-rate alt-As and a greater proportion of non-owner occupied properties. Finally, similar to the fixed-rate side, alt-A hybrids contain more prepayment penalties than jumbos. In hybrids, however, the difference is magnified. For instance, 2002 fixed-rate jumbo alt-As had 11% prepayment penalties, 9% more than 2002 fixed-rate jumbos. On the hybrid side, 2002 jumbo alt-As had 29% prepayment penalties, about 28% more than 2002 jumbo hybrids.

Figure 4. **Jumbo vs. Jumbo Alt-A Borrower Characteristics**, by Origination Year

	Balance (\$ mn)	Avg. Ln Size (\$K)	Avg. LTV (%)	% LTV >80	Avg. FICO	FICO <650	Non- Own (%)	Lim Doc (%)	% Cash-Out Refi	Prepay Penalty (%)	Prepay Penalty Term (mos.)	% CA
2001												
5/1 Jumbo	16,476	475	68	3	727	6	4	36	21	2	38	63
5/1 Jumbo Alt-A	1,431	549	68	4	714	6	17	65	45	25	45	67
Fixed Rt. Jumbo	67,174	418	71	6	730	5	3	20	21	3	57	45
Fixed Rt. Jumbo Alt-A	14,606	414	76	21	701	15	7	70	32	13	46	49
2002*												
5/1 Jumbo	17,896	469	68	3	731	5	3	35	16	1	36	63
5/1 Jumbo Alt-A	1,898	538	70	5	715	4	15	65	38	29	39	64
Fixed Rt. Jumbo	43,953	451	68	3	736	4	3	23	20	2	59	47
Fixed Rt. Jumbo Alt-A	13,105	438	75	16	708	13	7	73	27	11	42	49

Source: Loan Performance.

* 2002 data includes mortgage originations through November 30.

At the issuer level, alt-A hybrids are fairly homogenous (Figure 5). This differs from the fixed-rate alt-A market, where issuer characteristics have diverged meaningfully over the last few years. Comparing the top two alt-A hybrid ARM issuers shows that the average LTVs and FICO scores, as well as the distribution of these credit measures, is relatively similar, but the level of non-owner occupied properties and limited documentation varies considerably. In 2002, the largest originator, SASCO, had a 21% non-owner occupied concentration and 50% limited documentation, about 9% more and 21% less than the next largest originator, respectively. On the jumbo side, hybrid collateral quality across issuers shows very little tiering, similar to the fixed rate jumbo market.

PREPAYMENTS²

In this section, we give an overview of hybrid jumbo prepayments, focusing principally on comparisons with fixed rate jumbos and 5/1 agency hybrids.³ While we will present a more detailed analysis of prepayments in a later publication, here we outline the main features of hybrid prepayments, such as seasoning and refinancing profiles.

In this analysis, we measure the relative coupon (the weighted average refinancing incentive) of a jumbo hybrid pool as the difference between the pool's gross WAC and the prevailing jumbo hybrid rate. This measure implicitly assumes that hybrid borrowers refinance principally into new hybrids, similar to the underlying assumption used in most analyses of fixed rate prepayments. However, the incentive to refinance into other types of mortgages (i.e., fixed-rate mortgages) can be estimated by incorporating the effect of the slope of the yield curve. We define the slope of the yield curve as the difference between the 30-year jumbo fixed mortgage rate and the 5-year jumbo hybrid rate. Since 1999, this spread has been 60 bp on average (Figure 6).

CURRENT COUPON SEASONING

Figure 7a shows current coupon seasoning curves for 5/1 jumbo hybrids. Prepayments increase steadily for approximately the first two years, where they plateau before picking up as the roll date nears. The balance weighted prepayment rate for the first five years is

² All information on non-agency prepayment performance presented in our analysis is calculated from loan-level data provided by *LoanPerformance*. Originators include Bank of America, Bear Stearns, Countrywide, First Horizon, Master Trust, Residential Funding, Structured Asset Securities, Washington Mutual, and Wells Fargo.

³ In the ensuing prepayment analysis, all estimates are based on our non-agency prepayment model.

Figure 5. **Alt-A Borrower Characteristics by Issuer, 2002 Origination Year***

	Top Issuers	Balance (\$ mn)	Avg. LTV (%)	% LTV >80	Avg. FICO	FICO <650	Non-Own (%)	Lim Doc (%)
5/1s Hybrid	SASCO	3,582	70	10	718	2	21	50
5/1s Hybrid	CSFB	615	75	10	707	8	12	56
Fixed rate	CWF	7,178	76	21	NA	NA	11	70
Fixed rate	RFC	6,636	83	40	717	8	19	44

*Includes data through November 30, 2002.
Source: Loan Performance.

19% CPR, which is consistent with the typical pricing speed for 5/1 hybrids of about 20%-25% CPR. This current coupon prepayment rate is faster than fixed-rate jumbos and approximately the same as 5/1 agency hybrids (until month 30, after which jumbo hybrids prepay substantially faster) (Figure 7b); the prepayment differences during the first 5 years average approximately 8% and 2% CPR, respectively. The faster current coupon prepayments of jumbo versus agency hybrids are consistent with the greater mobility of higher income borrowers; the same phenomenon is observed when comparing jumbo fixed-rate with agency fixed-rate loans. In the same vein, jumbo hybrids should prepay faster than jumbo fixed-rate loans, given that ARMs generally attract shorter-horizon borrowers. Finally, shorter teaser periods translate, as one would expect, into faster current coupon prepayments. Figure 7c illustrates estimated jumbo hybrid current coupon seasoning curves by program type.

Figure 6. Non-Agency Hybrid ARM vs. Fixed Mortgage Rates

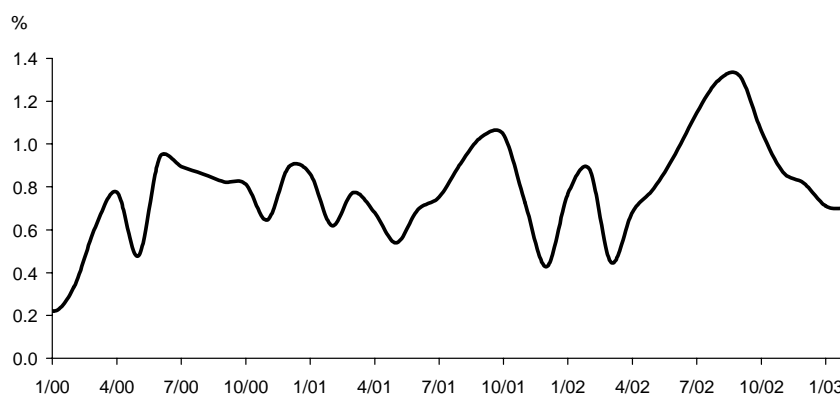
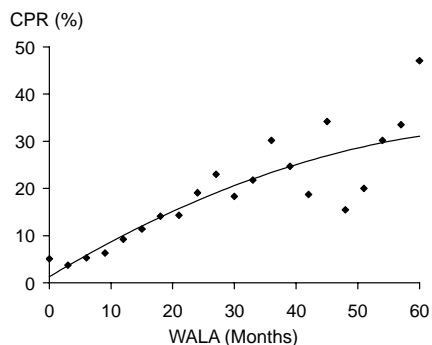


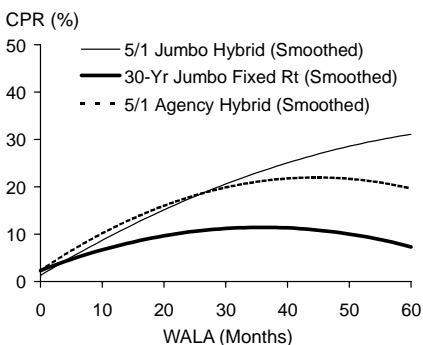
Figure 7. Seasoning Curves

a. 5/1 Hybrids*



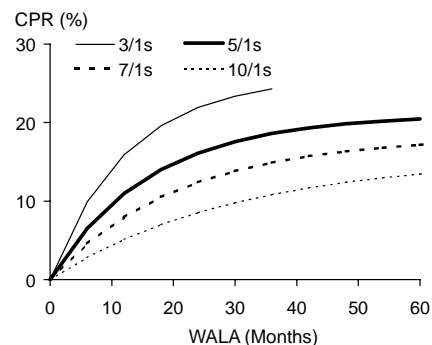
Shows actual data for period January 1997-March 2002; -50 bp < 0 bp relative coupon.

b. 5/1 Hybrids vs. Fixed rate Jumbos*



*Shows actual prepayments for the period January 1997-March 2002; -50 bp < 0 bp relative coupon.

c. Jumbo Hybrids by Program Type*



*Shows estimated seasoning curves; -50 bp < 0 bp relative coupon.

RATE SENSITIVITY

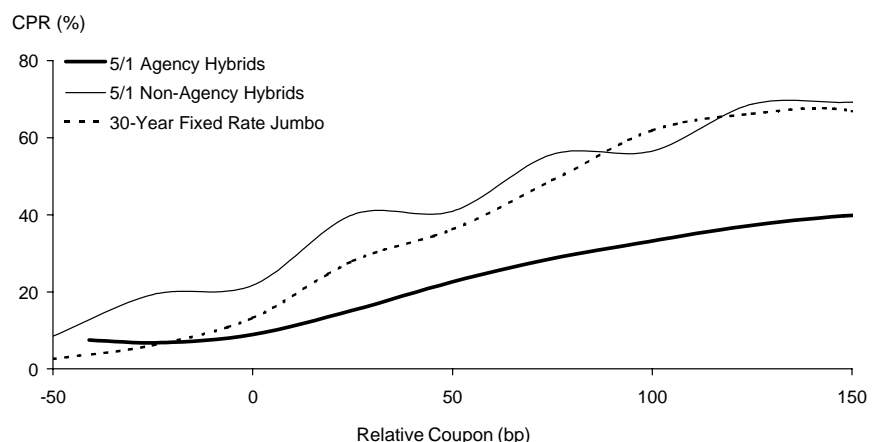
Figure 8 illustrates the prepayment experience for unseasoned (0-12 WALA) 5/1 jumbo hybrids, 5/1 agency hybrids, and fixed-rate jumbos during 2001 and 2002. We segment the data by relative coupon, which, again, is defined for each loan type as the difference between the current WAC and the prevailing rate for that same loan type. At a zero relative coupon, unseasoned hybrids prepay about 5% CPR faster than fixed-rate jumbos, but as we move in the money (as the rate incentive increases), fixed-rate jumbo prepayments converge with jumbo hybrid prepayments. That is, even though hybrids prepay faster at current coupon, they are actually less callable than fixed-rate loans. This result is intuitively reasonable, since, at a given rate incentive, the shorter horizon of hybrid borrowers should lead to a lower net present value of interest savings than for fixed-rate borrowers.

Relative to agency hybrids, however, jumbo hybrids are significantly more callable. For example, at +100 bp refinance incentive, jumbo hybrids prepay at 57% CPR, versus 33% CPR for agency hybrids. This difference can be explained principally by loan size: the average loan size of jumbo 5/1 hybrids is approximately \$300,000 greater than agency 5/1 hybrids;⁴ at this loan size difference, we observe approximately a 20% CPR prepayment difference at 100 bp relative coupon.

The above analysis measures hybrid refinance incentive relative to prevailing hybrid rates without controlling for the shape of the yield curve. Clearly, though, for a given hybrid refinance incentive, as the curve flattens, jumbo hybrid prepayments should increase, since the attractiveness of refinancing into a fixed-rate mortgage increases. Even at zero

⁴ Agency hybrid loan sizes are not always directly observable. As a point of comparison, we look at 30-year fixed rate conventionals and 5-year agency balloons. Over the time period in our data (1997-2002), jumbo hybrids have loan sizes that are larger by \$310K and \$280K, respectively.

Figure 8. **5/1 Jumbo Hybrid ARM Refinancing Patterns**
January 2001-August 2002, 0-12 WALA



refinance incentive, a flatter curve at origination should boost prepayments: borrowers taking out hybrids (rather than fixed rate loans) in a flat yield curve environment probably have shorter horizons than borrowers taking out hybrids in a steep yield curve environment. Figures 9a and b illustrate the estimated impact of a ± 75 bp yield curve flattening/steepening (measured by the difference between the 30-year jumbo fixed mortgage rate and the 5-year hybrid jumbo mortgage rate). The average slope is 65 bp in our sample: a flattening of 75 bp would lead to a 5% CPR increase in current coupon speeds and 10% CPR when loans are 100 bp in the money.

HYBRID ARM CREDIT PERFORMANCE

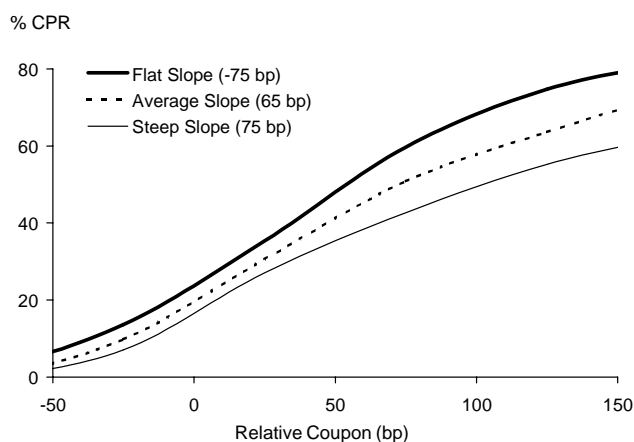
As shown in Figure 10, hybrid jumbo and fixed-rate jumbo delinquency performance track one another very closely. This is not surprising since borrower characteristics between the two are very similar. In contrast, hybrid jumbo alt-A delinquency performance is slightly better compared with fixed-rate jumbo alt-A. This is also consistent with the differences in collateral between the two. As noted above, the distribution of LTVs and FICO scores in 2001 hybrid jumbo alt-As are better versus fixed-rate jumbo alt-As. Looking at the same delinquency data as a percentage of the original balance (i.e., taking into account paydowns) does not alter the conclusion. Lastly, this delinquency performance needs to be viewed in the context of subordination. As shown in Figure 11, hybrid subordination levels have remained stable since 2000, and hybrids typically enjoy slightly higher subordination levels at origination than fixed-rate product.

STRUCTURE OVERVIEW

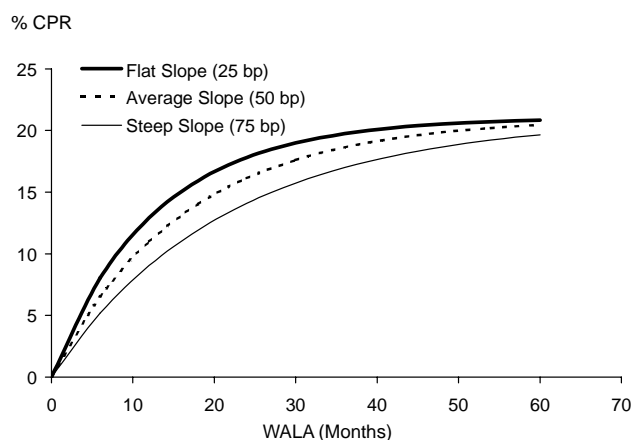
Hybrid securitizations are broadly similar in structure to generic jumbos, using a senior/subordinate structure with no excess spread. However, hybrids have some unique structural features that deserve explanation: namely, frequent issuance of a super-senior bond, a “hard” auction call on certain structures, lockout/stepdown differences from fixed-rate pools, and the use of net WAC caps instead of ratio stripping.

Figure 9. Effect of Yield Curve Slope on Hybrid Prepayments*

a. Effect on Refinancings



b. Effect on Turnover



*Model estimates.

The subordinated tranches are locked out of receiving prepayment distributions for approximately 5-7 years in 5/1s, 7/1s, and 10/1s, and 10 years in 3/1s, after which they begin receiving a majority but decreasing portion of prepayments. The actual percentage allocation of prepayments to the senior and subordinate tranches is specified by the shifting interest schedule. Figure 12 illustrates a typical shifting interest schedule of a 5/1 hybrid with a 7-year lockout period. The payment percentages after the lockout are essentially identical to those of fixed-rate structures.

Figure 10. Hybrid ARM vs. Fixed rate 60+ Day Delinquencies, 2001 Origination Year

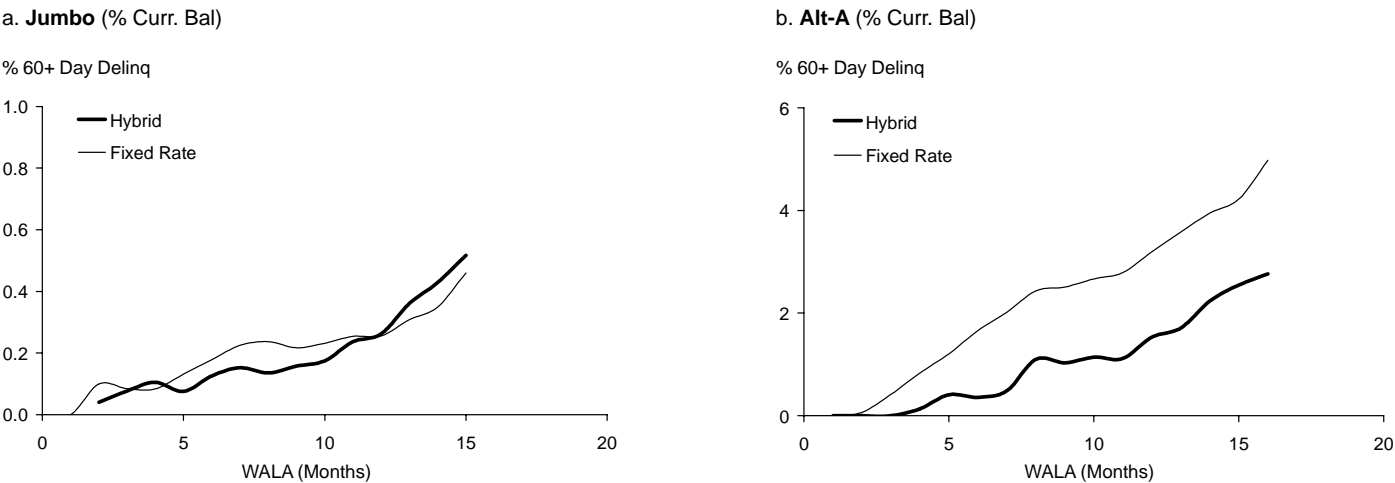
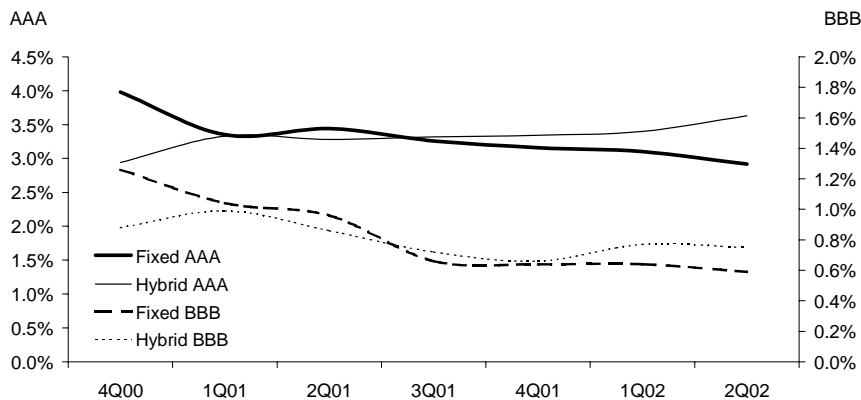


Figure 11. Hybrid Subordination Levels at Origination



Source: S&P.

Recently, Standard and Poor's updated its lockout criteria for prepayment distributions. Under the added guidelines implemented October 1, 2002, if a mortgage pool contains a mixture of ARM and hybrid ARM loans, the lockout period is adjusted according to the program type. See Figure 13 for a full description of the criteria. Secondly, if a mortgage pool is mixed, and 50% or more of the loans require only interest payments during the fixed rate leg, the lockout on transactions with a 5-year lockout is extended by 2 years. Interest-only loans are considered riskier from a credit standpoint because at the reset a borrower moves from making interest-only payments to making principal and interest payments. For example, for a pool of 5/1 hybrids, with 51% interest-only 5/1 hybrids,⁵

⁵ 5/1 I/O hybrids pay only interest during the fixed-rate period.

Figure 12. **Shifting Interest Schedule**

Month	Senior %	Senior % of Sub. Prepayments	Subordinate %
1 -83	100% of Tot. Prepayments	-	-
84-96	Pro Rata share	70%	30%
97-108	Pro Rata share	60%	40%
109-120	Pro Rata share	40%	60%
121-132	Pro Rata share	20%	80%
133-Forward	Pro Rata share	-	Pro rata share

Figure 13. **Rating Agency Lockout Criteria**

If the mortgage pool has a mixture of different ARM/hybrid ARM loans, the required lockout periods will be as follows:

- 1) Any combination of 10/1, 7/1, and 5/1 ARMs: 5-year lockout period.
- 2) Any combination of 3/1, 2/1, and 6 month/1 year ARMs: 10-year lockout period.
- 3) A combination of loans from I and II above:
 - a) If $\geq 75\%$ of the loans are from I or II above, the lockout period associated with the majority of loans as stated above.
 - b) The ratio of loans from I and II above are more evenly split ($<75:25$), 7 year lock-out period.

If the mortgage pool has a mixture of ARM/hybrid ARM loans and $>50\%$ of the loans require interest only payments during the fixed period, the lockout period required based on the specific combination of ARM/hybrid ARM loans as stated above will be changed as follows:

- 1) a 5-year lockout period will be increased to a 7-year lockout period
- 2) a 7-year lockout period will remain unchanged
- 3) a 10-year lockout period will remain unchanged.

If $\leq 50\%$ of the loans require Interest Only payments during the fixed period, the lock-out period will remain unchanged from what is stated above.

One major difference between hybrid and fixed-rate transactions falls under a loss test whereby subject to certain criteria, prepayments are released to the subordinate classes prior to the end of the lockout period. Under the specified conditions, subordination to the senior classes needs to double from the original aggregate percentage. If subordination doubles within the first 36 months, the senior classes receive their pro rata share of prepayments and 50% of the subordinates' share. In the same time frame, losses cannot exceed 20% of the original principal balance of the subordinate classes. If the doubling of subordination occurs after 36 months, prepayments are distributed pro rata to both senior and subordinate classes. The loss threshold is increased to a maximum of 30% of the original principal balance of the subordinate classes. Lastly, in both cases, the average outstanding principal balance of 60+ day delinquent loans over the past 6 months must not exceed 50% of the outstanding principal balance of the subordinate classes.

Source: Standard & Poor's.

the standard lockout on the subordinate bonds increases from 59 months to 83 months. While we have not historically tracked the percentage of interest-only loans across deals, the majority of deals since October 1, 2002, have a high percentage (>50%) of interest-only loans and, therefore, have a seven-year lockout.

Another structural feature that appears more frequently in hybrid transactions than in fixed-rate transactions is the “super-senior” structure, established in response to investor concern about the high California concentrations in hybrid pools. We estimate that 10%-20% of deals in the market use this structure. Figure 14 illustrates a typical super-senior structure, using a hypothetical 5/1 jumbo hybrid deal. Under this structure, a portion of the last cash flow AAA tranche is subordinated to the other AAA tranches for loss-coverage purposes. In general (i.e., independent of whether there is a super-senior bond or not), losses are allocated to the most junior class of subordinate certificates outstanding at the time the loss occurs. In the event that the principal balances of all the subordinate bonds have been eliminated, losses are allocated to the subordinate AAA tranche before being allocated to the other AAA tranches. On a spread basis, the AAA mezzanine tranche will trade approximately 25-35 bp wider than the corresponding AAA last cash flow super senior (of the same average life).

Another important structural feature of some hybrid securitizations is a mandatory call on the first reset date. Approximately 40% of WAMU 2002 hybrid securitizations included a mandatory call. In these securitizations, the securities sold correspond only to the hybrid cash flows during the teaser (fixed-rate) period, with a mandatory auction on the AAA securities outstanding at the roll date. Under the call feature, the trustee (auction administrator) enters into an advance agreement (Par Priced Payment Agreement) with a highly rated counterparty to transfer AAA securities outstanding to third-party investors at par plus accrued interest. In return, the counterparty agrees to pay the auction administrator the entire outstanding principal balance (plus accrued interest) of any unsold certificates. This obligation to purchase the securities at par is unconditional: for example, even if the bonds have been downgraded below AAA, the counterparty assures a par purchase. In this example, the auction call would actually function as a form of credit enhancement (though it would not cover bond writedowns). Moreover, even if the counter-party fails to abide by the agreement, there is a strong economic incentive for another party to step in at the auction date. As we will see, the value of the AAAs will be greater than par in most scenarios.⁶

We provide an example of a deal with the call feature and its effect on the characteristics of AAA securities using a recent securitization, WAMU 2002-AR15. This transaction was issued in October 2002 and based on 5/1 jumbo hybrids with a seven-year lockout on the subordinates (approximately 76% of loans are interest-only loans.) The class A is sequentially tranching with a mandatory auction after 5 years. In this transaction, Wells Fargo Bank, N.A., entered into an advance agreement to purchase all the unsold securities at the time of reset. As a result of this auction, none of the sequential securities extend beyond 57 months.

⁶ According to the Par Price Payment Agreement, if the counterparty is downgraded, it must turn over all its rights and obligations to another party with a short-term unsecured debt rating of at least A-1/P-1. In the event that the senior bonds are downgraded, the counterparty maintains all its rights and obligations under the Par Price Payment Agreement.

Lastly, it is important to note that hybrid securitizations typically employ net WAC caps which limit bond coupons to the net WAC of the collateral at any particular time. This adds a layer of risk to the securities. Put simply, the WAC dispersion of the underlying loan pool can result in a declining net WAC when prepayments are fast because the premium loans will likely prepay faster. Depending on the specifics of the deal structure, the net WAC could fall below the bond coupon, causing a shortfall, in which case the bonds endure coupon erosion.

VALUATION OF NON-AGENCY HYBRIDS

Pricing Convention & Basic Bond Profiles: The Tail Is Worth Over Par

Non-agency hybrid ARM AAA passthroughs are priced to the weighted-average roll date (the reset date). There are two primary reasons for this convention: first, as discussed above, a minority of deals contains a mandatory auction call at month 60 (the roll date), and second, even for deals without the call option (most deals), the tail will be worth more than par under most scenarios. That is, it is highly likely that investors could sell the tail for more than par at the roll, replicating a mandatory call. For the purposes of our valuation, then, we will assume that all securities are priced to the roll date.

Figure 14. **Super-Senior Structure**

A1 AAA 14.8%	A2 AAA 17.3%	A3 AAA 22.4%	A4 AAA 11.1%	A5 AAA 28.2%	↑ L O S S E S
A6 AAA 1.2%					
B1 AA 0.8%					
B2 A 0.8%					
B3 BBB 0.5%					
B4 BB 0.2%					
B5 B 0.1%					
B6 Not Rated 0.3%					

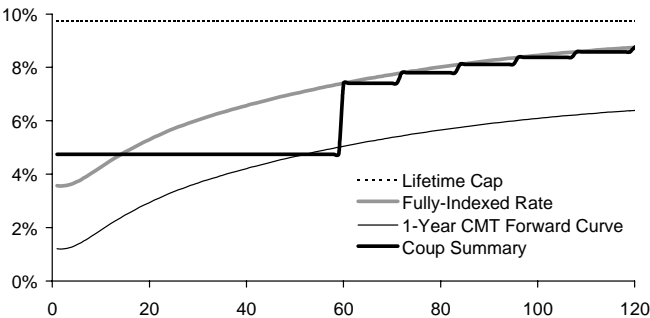
The above-par value of the tail is a significant component of valuation and market conventions, and it is worthwhile to explain more fully why this is so. The loan rate typically resets to 1-year LIBOR + 225 bp, or 1-year CMT + 275 bp, and is subject to caps, most typically a 5/2/5 structure. Figure 15a. illustrates the coupon step-up of a 5/1 LIBOR-based hybrid with a 225 bp gross margin; at the roll date, the coupon moves from 4.65% to 7.21% (1-year LIBOR plus the net margin, subject to the first reset cap). Even though these caps are out-of-the-money, the LIBOR margin is high enough that the tail value is unlikely to be below par. In Figure 15b, we price the premium above par of the tail at the roll date under various prepayment and LIBOR OAS assumptions. (Note that these prices are the present value of the tail premium at the roll date, not at the origination of the pool.) In general, increasing prepayments decrease the value of the tail: although the caps become less costly as prepayments increase, the lower value of the premium coupon stream is the dominant effect. Clearly, widening spreads also decrease the tail value. It can be seen that, at 50 LOAS, the tail is worth between 14/32 and roughly 1 point over par. Under a severe spread widening scenario of 100 LOAS, the breakeven prepayment assumption is roughly 55% CPR. By way of comparison, most short average life, AAA rated LIBOR floaters trade at LIBOR OAS of 25-40 bp in the current environment.

While the pricing speed will change for different collateral WACs, generally, par coupon passthrough pricing speeds range are 20%-25% CPR. Figure 16 shows historical new issue spreads for par-priced and \$101-priced 5/1 hybrid passthroughs. We note that slight premium (\$101) securities generally have the same underlying gross WAC as par priced securities; the spreads in Figure 16 assume that this is the case. Premium securities have traded with a stable nominal spread concession (15-20 bp) versus par priced securities.

In Figure 17, we show OAS valuations of par priced and premium jumbo hybrids, as well as agency hybrids and 3-year jumbo fixed rate sequentials. Within the jumbo hybrid

Figure 15. 5/1 Jumbo Hybrid Tail Valuation

a. Jumbo 5/1 Hybrid Coupon Graph



GWAC/Coup 5.30%/4.65%.

b. Tail Value above Par at the Roll Date, in 32nds

	CPR		
	40%	50%	60%
0 LOAS	1 31/32	1 12/32	30/32
50 LOAS	1 3/32	26/32	14/32
100 LOAS	8/32	2/32	-3/32

Run on 1/11/03; Jumbo 5/1 Hybrid Mtg Rt: 5.2%.

Figure 16. New Issue Hybrid Spreads, Spread to Swaps

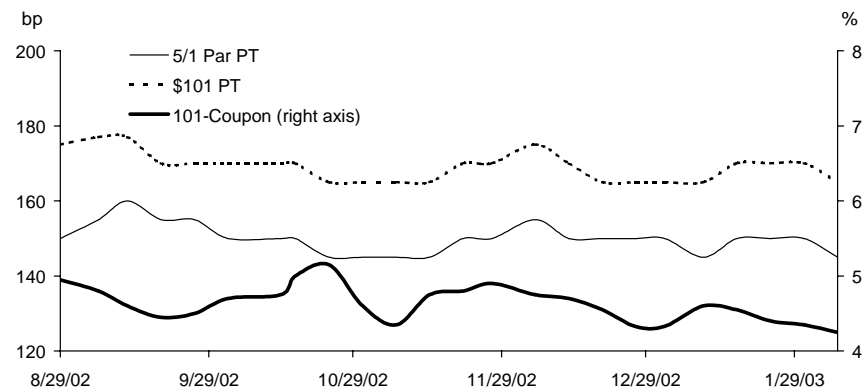


Figure 17a. Cross Sector OAS Analysis

	Price	GWAC/Coup	Yield	Avg. Life	OAD	LOAS	OAC	Option Cost	ZV Spread
Jumbo 5/1 Hybrid Par Coupon PT	100-01	5.08%/4.10%	4.02	2.34	2.77	56	-1.0	30	86
Jumbo 5/1 Hybrid Premium PT	101-00	5.08%/4.70%	4.15	2.34	2.50	80	-1.1	34	114
Agency 5/1 Hybrid PT	101-31	5.00%/4.50%	3.67	3.03	2.33	45	-1.0	26	72
Jumbo Fx Rt 3-Yr Seq.	102-12	6.5%/5.75%	5.01	3.77	2.95	21	-3.5	100	121

Valuation was run on 1/30/02; Jumbo 5/1 Hybrid Mtg Rt. 5.08%.

Figure 17b. Lehman Brothers Prepayment Model Projections, Long Term % CPR

	Rate Shift (bp)						
	-150	-100	-50	0	50	100	150
Jumbo 5/1 Hybrid Par Coupon PT	57	50	39	27	14	13	12
Jumbo 5/1 Hybrid Premium PT	57	50	39	27	14	13	12
Agency 5/1 Hybrid PT	49	46	32	19	15	14	13
Jumbo Fx.Rt Seq.	69	53	35	13	9	8	7

Valuation was run on 1/30/02; Jumbo 5/1 Hybrid Mtg Rt. 5.08%.

Figure 17c. Average Life Profile, Years

	Rate Shift (bp)						
	-150	-100	-50	0	50	100	150
Jumbo 5/1 Hybrid Par Coupon PT	1.07	1.27	1.57	2.34	2.60	2.65	2.69
Jumbo 5/1 Hybrid Premium PT	1.07	1.27	1.57	2.34	2.60	2.65	2.69
Agency 5/1 Hybrid PT	1.62	1.85	2.41	2.99	3.30	3.35	3.39
Jumbo Fx.Rt Seq.	0.43	0.58	1.06	3.77	5.41	6.11	6.74

Valuation was run on 1/30/02; Jumbo 5/1 Hybrid Mtg Rt. 5.08%.

world, premiums are (perhaps unsurprisingly), attractive on an OAS basis versus par securities: since we are holding gross WAC constant (and increasing only bond coupon), there is only a marginal option cost/convexity difference versus par priced securities. These securities are, in our view, attractive alternatives to both agency hybrids and short-duration jumbo sequentials. Though lower yielding than jumbo sequentials, hybrids are significantly less negatively convex and offer LIBOR OAS pickups of 20-40 bp; moreover, hybrids also provide significant extension protection relative to fixed rate jumbos. In a 100 bp rate back-up, jumbo hybrids extend about 0.30 years, while fixed-rate jumbos extend by about 3.0 years (Figure 17c). Versus agency hybrids, the market is fairly efficient at pricing the convexity differences between agency and non-agency collateral: at similar (101 handle) dollar price, jumbo hybrids offer an approximately 15-20 bp OAS pickup versus agency hybrids, roughly equal to the historical average OAS difference between fixed rate jumbo and agency collateral.

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