

# Fixed-Rate IO Mortgages

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## Sharad Chaudhary

sharad.chaudhary@bankofamerica.com  
(212) 583 8199

## RMBS Trading Strategy

### Ohmsatya Ravi

ohmsatya.p.ravi@bankofamerica.com  
(212) 933 2006

### Qumber Hassan

qumber.hassan@bankofamerica.com  
(212) 933 3308

### Sunil Yadav

sunil.s.yadav@bankofamerica.com  
(212) 847 6817

### Ankur Mehta

ankur.mehta@bankofamerica.com  
(212) 933 2950

## RMBS Modeling

### ChunNip Lee

chunnip.lee@bankofamerica.com  
(212) 583 8040

### Marat Rvachev

marat.rvachev@bankofamerica.com  
(212) 847 6632

### Vipul Jain

vipul.p.jain@bankofamerica.com  
(212) 933 3309

## Summary

- Agency pools collateralized by fixed-rate IO mortgages have seen a dramatic increase in issuance over the past few months. Most of the issuance has been concentrated in FNNP pools, which are collateralized by 10/20 mortgages.
- The choice of 10/20 loans from the menu of mortgage products suggests that the borrower base for this loan has a tenure horizon that is similar to a 10/1 borrower but shorter than a 30-year borrower. Also, the choice of an IO product with its associated lower monthly payments suggests that these borrowers will be concentrated in high cost areas and may tend to be more affluent and financially sophisticated than the average borrower.
- Although limited, the prepayment data show that the seasoning ramps on Agency 10/20 pools dominate those on 30-years and 10/1 non-IOs. The somewhat surprising result vis-à-vis 10/1 non-IOs is probably due to the fact that 10/20 borrowers appear to have been concentrated in areas that have seen higher home price appreciation over the past few years.
- While FNNP pools have been prepaying fast, we suspect that over the long-term they will prepay much closer to 10/1s as home prices start to mean revert and the 10/20 mortgage becomes a more established product.
- At even OAS, our models suggest that the fair value of FNNP 5.5s is 4 ticks behind FNCL 5.5s and that of FNNP 6s is 1+ ticks behind FNCL 6s. FNNP pools are currently trading 16-20 ticks behind their amortizing 30-year counterparts.

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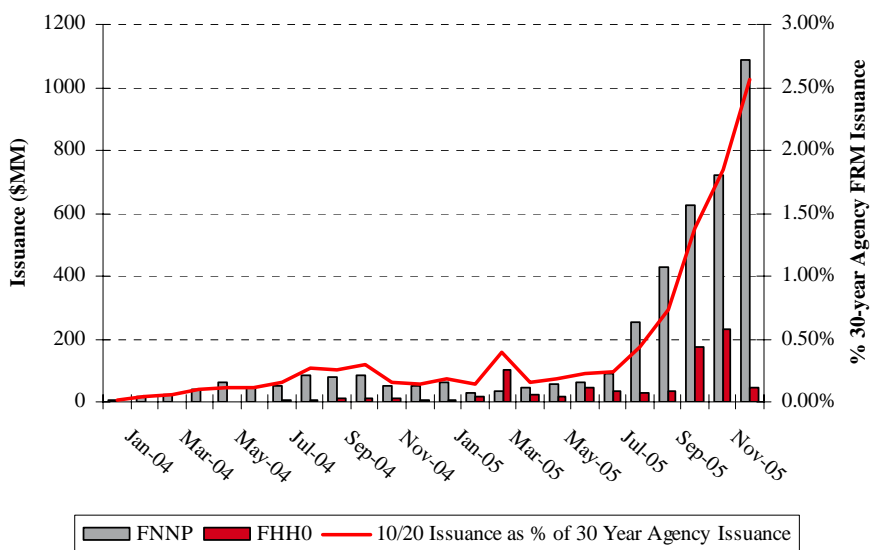
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**Introduction**

Within the plethora of alternative mortgage types that have been introduced over the past few years, one product that has attracted a fair amount of attention in recent months is a fixed-rate interest-only (IO) mortgage. Borrowers make only interest payments over the IO term of the loan, after which the loan switches to being fully amortizing for the remainder of the mortgage term. For example, one of the most popular types of IO mortgages is a 10/20 mortgage: these are 30-year fixed-rate loans with an IO term of 10 years followed by a fully amortizing term of 20 years. Note that the lack of principal amortization over the IO term results in a spike in scheduled payments at the end of the IO term thus subjecting borrowers to a payment shock.

Fixed-rate IO mortgages are available in a number of different flavors, with 10/20s being the most popular by a wide margin.<sup>1</sup> 10/20s are securitized in the agency market in FNNP (Fannie Mae) and FHH0 (Freddie Mac) pools. Figure 1 demonstrates that fixed-rate IO pools have comprised an increasing portion of Agency fixed-rate production over the past year or so. Figure 2 shows that this trend is even more pronounced in the alt-A sector -- a number of conforming balance fixed-rate IO mortgages have been placed in alt-A deals with private-label execution continuing to offer a competitive alternative for originators.

**Figure 1: Monthly Agency 10/20 IO Issuance: 2004 - Current**



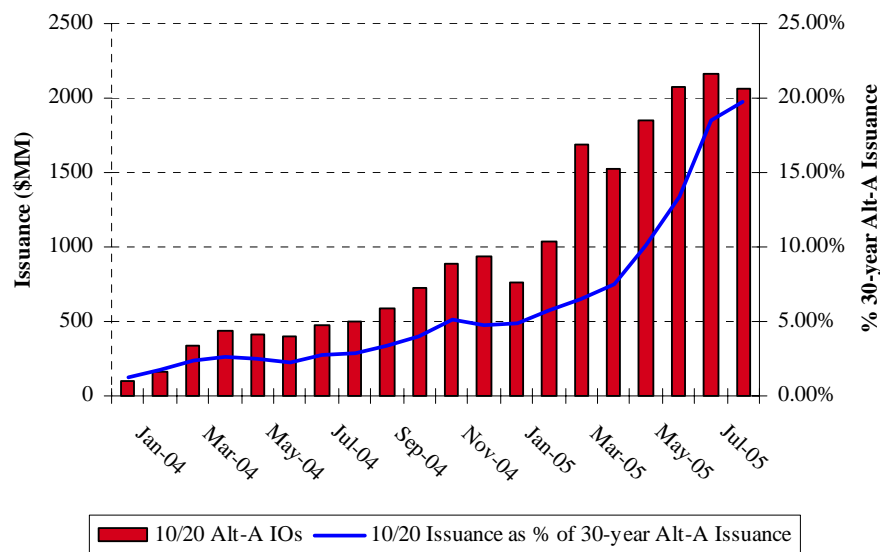
Source: Banc of America Securities

<sup>1</sup> 10/20-backed pools constitute between 80% to 90% of all agency fixed-rate IO production.

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Figure 2: Monthly Alt-A 10/20 IO Issuance: 2004 - Current



Source: Banc of America Securities, Loan Performance

The popularity of 10/20s can be ascribed to the same fundamental factor that has driven the explosion of alternative mortgage products over the past few years – a decrease in housing affordability. All of the so-called “affordability products” are associated with a lower initial monthly payment, thus making it easier to qualify for a larger mortgage. We expect issuance of IO mortgage-collateralized pools to remain robust as long as housing affordability continues to be a concern.

As always, the central question at hand is determining the prepayment characteristics of borrowers in IO pools since this would give us some sense of where these pools should trade relative to TBAs (assuming even OAS). We attempt to address this question based on the available prepayment data but this requires making a fair number of extrapolations since prepayment history on these pools more or less dates back to 2004 (see Figures 1 and 2). Another approach is to make inferences about the prepayment behavior of these borrowers based on their choice of a 10/20 mortgage from a product menu of various types of ARMs and FRMs. The details are spelled out in the next section.

### Understanding the 10/20 Borrower

The modern day menu of mortgage products offers a number of different options for borrowers. For some time now, borrowers have been able to choose between Hybrid ARMs with various different reset terms (1/1s, 3/1s, 5/1s, 7/1s, 10/1s) and fixed-rate mortgages with different terms (10-, 15-, 20-, or 30-years). These mortgages were traditionally fully-amortizing but the landscape has become even more crowded with the availability of IO-variants of the above mortgages. In order to choose between these different products, a borrower must consider a number of different factors including:

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- The borrower's current financial situation and their expectations for future income growth;
- How long the borrower intends to stay in the house ("tenure");
- How comfortable the borrower is with the mortgage payment changing and;
- The cost of the mortgage relative to other available mortgage products.

The list above, while not exhaustive, gives a sense for the complexity of the decision. Thus, the choice of a 10/20 mortgage from the menu of available mortgage types in and of itself tells us something about the 10/20 borrower relative to those choosing other mortgage products. For example, it tells us that the borrower in question probably has a tenure horizon that is longer than that of a 5/1 borrower or 7/1 borrower, but shorter than a 30-year borrower.

To dig a little deeper, take a look at Figure 3, which compares terms on a 10/20 mortgage versus other mortgage products which would nominally appear to be substitutes. The figure shows that after 10/1 IO ARMs, 10/20s have the lowest monthly payment, although they have the highest interest cost. On the other hand, 10/1 ARM IO borrowers face the largest payment shock at reset (not shown in the figure), followed by 10/20 borrowers. Some of the possible inferences we can make about the 10/20 borrower are:

- The tenure horizon of the 10/20 borrower should be similar to that of a 10/1 ARM and 10/1 ARM IO borrower. Arguably, the horizon may be somewhat lower than that of a 10/1 borrower since the 10/20 borrower is exposed to more of a payment shock and thus needs to be more certain that they will have moved by the time the mortgage payment resets. Complicating matters is the fact that the 10/1 payment shock is stochastic, while the 10/20 payment shock is deterministic.
- Another possibility is that the 10/20 borrower expects to have greater income growth 10 years down the road than any of the other borrowers (except 10/1 IO ARM borrowers) since they take on more of a payment shock.
- The 10/20 borrower may be able to invest their principal in assets that provide greater returns than housing.

**Figure 3: Monthly Payments for Various Mortgage Types on a \$200,000 loan**

<b>Mortgage Type</b>	<b>Initial Monthly Payment (\$)</b>	<b>Mortgage Rate (%)</b>	<b>Rate Differential (bp)</b>	<b>Initial Payment Differential (\$)</b>	<b>Initial Payment % Differential</b>
30-year Amortizing	1,219.75	6.16	0.0	0.00	0
10/1 ARM	1,191.40	5.94	-22.0	28.35	2
10/20	1,047.50	6.29	12.5	172.25	14
10/1 IO ARM	1,010.83	6.07	-9.5	208.92	17

Source: Banc of America Securities

It is probably reasonable to assume that the average borrower does not assess the trade-offs between different mortgage types in a very sophisticated manner and

the eventual mortgage choice is largely driven by tenure horizon and affordability (based on the initial mortgage payment). In particular, given the lower monthly payments, it is clear that the 10/20 borrower can afford a much larger house.

All of the above discussion makes the implicit assumption that “all else is equal.” In practice, of course, all else is not equal – a borrower may be picking a 10/20 mortgage because it is the only way they can qualify to buy a house in a high cost area. We can obtain another level of insight into the motivations of 10/20 borrowers by comparing the collateral characteristics associated with FNNP pools with some of the other mortgage products discussed above. To this end, Figure 4 shows the average borrower characteristics of FNNP and Alt-A conforming balance fixed-rate IO pools along with FNMA 30-years and 10/1s. While most of the characteristics for the different pool types appear to be close to each other, the figure does show that 10/20 borrowers appear to carry somewhat larger loan sizes. Our calculations suggest that the average home value for conforming fixed rate IO borrowers is approximately \$40,000-\$55,000 higher than for 30-year borrowers. Thus, these borrowers are either relatively affluent (have larger incomes) or tend to be concentrated in high cost areas and choose to opt for IO loans because of the added affordability.

**Figure 4: Origination Characteristics of Selected Agency and Alt-A 30-year Pool Types**

Ticker	Orig Year	WAC	Average Loan Size	FICO	LTV	Owner		1-Unit (%)	CA (%)	Average Home Price
						Refi (%)	Occ (%)			
<b>FNCL</b>	2004	5.96	\$164,456	715	73	52	92	96	22	\$225,282
<b>FNCL</b>	2005	5.92	\$177,919	718	72	52	90	97	17	\$247,110
<b>FNNP</b>	2004	6.19	\$204,238	719	74	51	98	99	31	\$275,997
<b>FNNP</b>	2005	6.17	\$225,064	718	74	61	93	99	24	\$304,141
<b>10/1 Non IO</b>	2004	5.56	\$182,511	726	70	58	90	95	24	\$260,731
<b>10/1 Non IO</b>	2005	5.71	\$199,448	728	69	54	85	96	23	\$289,055
<b>10/1 IO</b>	2004	5.79	\$211,396	732	69	40	91	97	34	\$306,370
<b>10/1 IO</b>	2005	5.89	\$232,373	733	69	46	87	96	27	\$336,772
<b>Alt-A IO (CB)</b>	2004	6.29	\$196,625	719	67	48	76	61	29	\$293,470
<b>Alt-A IO (CB)</b>	2005	6.10	\$204,308	724	69	50	85	62	22	\$296,099

Source: Banc of America Securities, Loan Performance. CB = Conforming Balance.

#### Summarizing:

- The tenure horizon of a 10/20 borrower is likely shorter than a 30-year borrower and may be somewhat shorter than a 10/1 ARM or 10/1 IO ARM borrower;
- The 10/20 borrower may have a larger income than a 30-year borrower;
- The 10/20 borrower typically lives in a more expensive home than a 30-year borrower; and
- The choice of an IO mortgage may suggest that the 10/20 borrower wishes to invest their principal in alternative assets and do not initially wish to build equity in their houses.

### Empirical Prepayment Behavior of the 10/20 Borrower

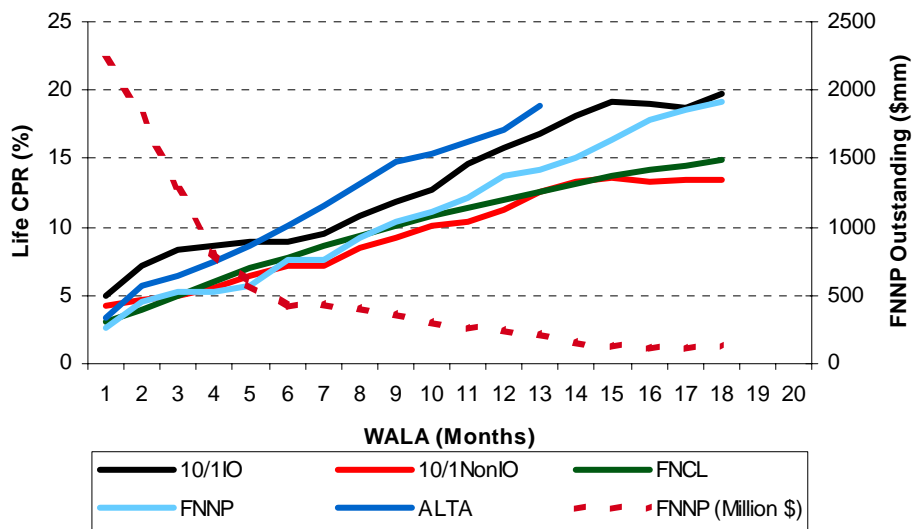
Our discussion above has allowed us to build a picture of the “expected” prepayment behavior of the 10/20 borrower even before we look at actual prepayment data:

- Borrowers in 10/20 pools should have mobility rates that are comparable to 10/1s and greater than 30-years;
- The refinance response of 10/20 pools should be comparable to 10/1 pools and somewhat less than that of 30-year pools;
- The higher home values of 10/20 borrowers suggests that they will be relatively concentrated in higher cost areas. Thus, the prepayment behavior of 10/20 pools may be more susceptible to home price trends in high cost states.
- 10/20 borrowers may be less likely to curtail since they are initially abstaining from repaying any of the principal on their mortgages.

We now examine to what extent the observed prepayment behavior on 10/20 pools is consistent with these expectations although, as initially noted, definitive conclusions are hard to come by since there is so little prepayment data. Figure 5 plots “at-the-money” prepayment speeds for a number of different mortgage products. The prepayment speeds depicted in the figure correspond to pools with loan sizes between \$175K and \$250K and a rate incentive between -25bp to +25bp. To smooth out the month-to-month noise in speeds (especially prevalent in 10/20 prepayment data), we’ve calculated life CPRs for each of the WALA buckets. Apart from a smoothing effect, the life CPR calculation also facilitates an easy comparison of the long-term trend for the different pool types. Finally, the figure also includes speeds on alt-A 10/20 loans since, as we mentioned earlier, many conforming 10/20 loans find their way into private-label securities.

Our expectation is that the seasoning ramp for 10/20s would be very similar to 10/1s but Figure 5 has some surprises in store for us – speeds on 10/20 pools in both the agency and alt-A sectors dominate non-IO 10/1s. Note that the figure does attempt to somewhat control for the home price environment by restricting the data sample to loans that were originated over the 2004-2005 time period. However, FNNP pools may tend to somewhat geographically “special” (less diverse) because of their relative abundance of high loan balance loans. In particular, notice the relatively high California concentrations associated with FNNP pools in Figure 4. If the high cost areas that 10/20 borrowers live in are also associated with high rates of home price appreciation, then the trends we see in the data would make more sense. The same line of reasoning could also be applied to 10/1 IO pools (and alt-As) which also appear to be seasoning very fast.

**Figure 5: “At-the-money” Seasoning Ramp for Various Mortgage Products: 2004/2005 Originations**



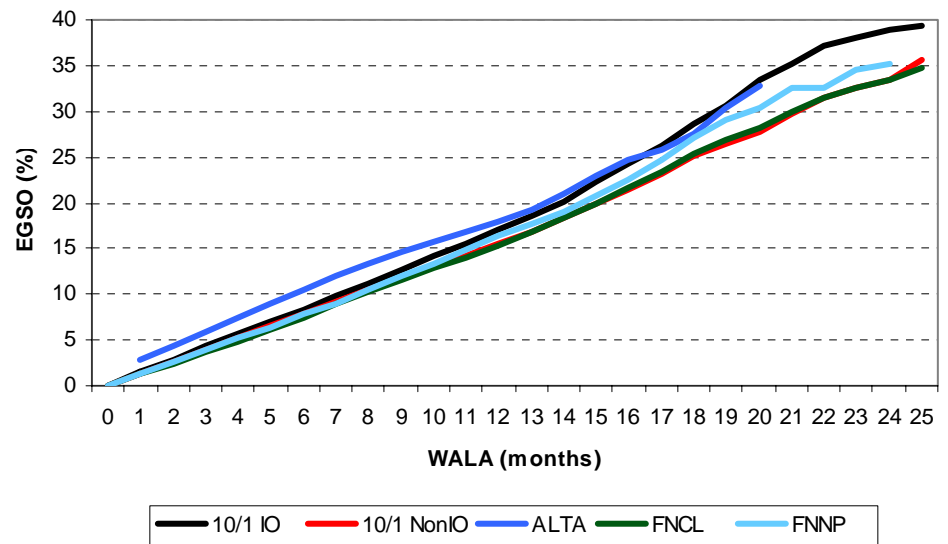
Source: Banc of America Securities

The home price experience of the borrowers underlying these different pool types is summarized in Figure 6. For each WALA bucket along the seasoning ramp, we compute the cumulative equity growth since origination (EGSO) experienced by the pools in that bucket using state-level home price data. The relationships between the EGSO curves for different product types in Figure 6 appear to be consistent with the prepayment experience summarized in the previous figure. First, the fastest seasoning mortgage types, alt-A and 10/1 IO pools, have seen the greatest home price appreciation over the past couple of years. Next, the slowest seasoning mortgage types, 10/1 non-IO and 30-year pools, have experienced the least home price appreciation relative to the other products. Finally, the seasoning ramp for FNNP pools lies between 10/1 IO pools and 30-year pools, consistent with the relation of the EGSO curve for 10/20s relative to these two other pool types. Summarizing, Figure 6 shows that 10/20 pools have been in areas that have been experiencing relatively high rates of home price appreciation, thus at least partly explaining the elevated seasoning ramps for this product. In particular, notice that the seasoning ramps for FNCL and FNNP pools begin to diverge around 11-12 months, right around the time that the EGSO curves start to drift apart.

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**Figure 6: Cumulative Equity Growth for Various Mortgage Products: 2004/2005 Originations**

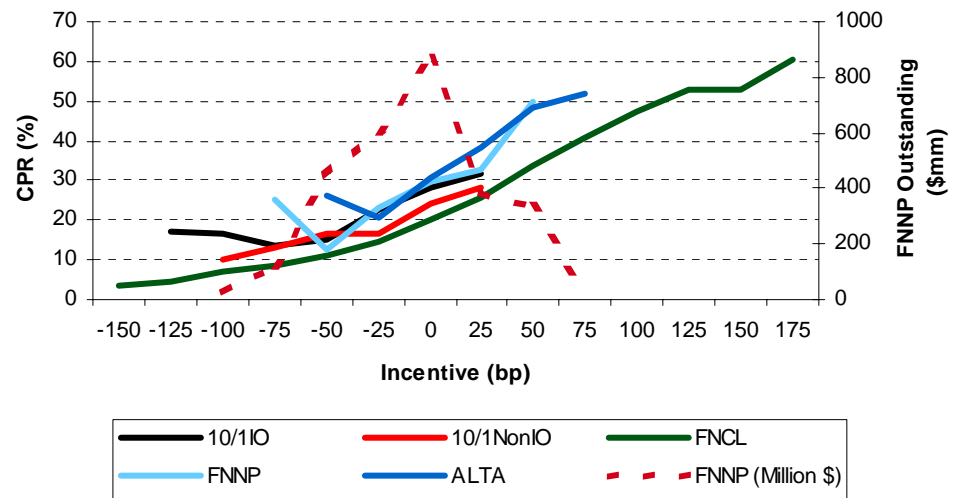


Source: Banc of America Securities

The next step in our prepayment study is to examine the prepayment “S-curves” for these different product types. As before, the plots are controlled for loan size. In addition, we only include pools with WALAs between 12 to 24 months in the S-curve comparisons to control for ramp and burnout effects.

The S-curves for different mortgage types are shown in Figure 7. In both out-of-the-money and at-the-money scenarios, the different hybrid ARM types and the 10/20s clearly have higher prepayment rates. As the rate incentive increases however, we see the greater responsiveness of the 30-year borrower start to make its presence felt.

**Figure 7: The Prepayment “S-Curve” for Various Mortgage Product Types: 2004/2005 originations**



Source: Banc of America Securities

#### Summarizing:

- “At-the-money” prepayment rates for 10/20 borrowers are currently higher than those on FNCL pools and 10/1s (Figure 5). We attribute most of this difference to the fact that the 10/20 borrowers are relatively concentrated in high cost areas that have experienced greater home price appreciation (Figure 6).
- “In-the-money” prepayment rates for 10/20 borrowers seem to be faster than those on 30-years but the differences appear to narrow as the incentive grows larger. There is little to no data for higher incentives given the relatively recent history of 10/20 loans.
- The data suggests that the refinance response of 10/20 borrowers is similar to that of 10/1 IO borrowers.

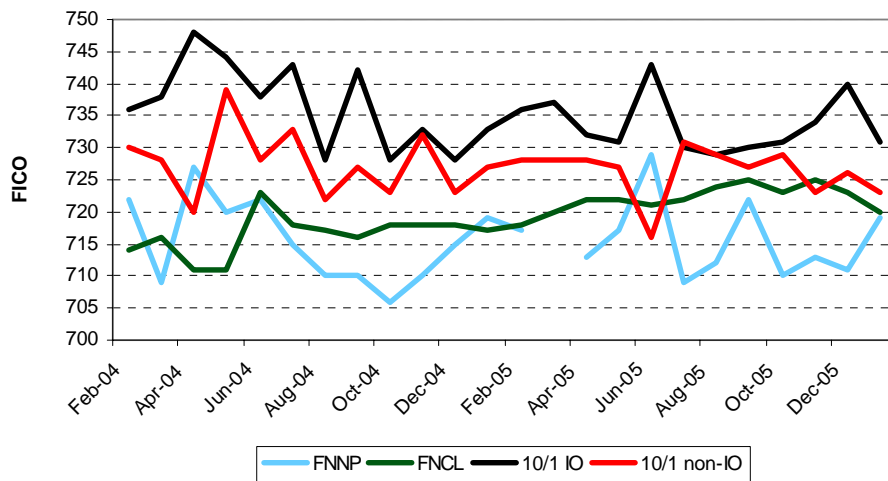
#### Looking Ahead: Will 10/20 Pools Continue to Prepay Fast?

Even without getting into bubble talk, the mean-reverting nature of home prices suggests that we should see some convergence in the home price appreciation seen by 10/20 borrowers versus other mortgage types over time. Thus, 10/20 pools are unlikely to prepay faster indefinitely, although it is not easy to identify when a convergence would take place.

There is another factor to consider. Since 10/20s are a recent innovation, both the pricing and borrower base for these mortgages are likely to evolve rapidly as competition to offer these mortgages increases and originators continue to refine their underwriting standards. In practice, this evolution can be monitored by tracking the mortgage rate differential between 10/20s and 30-years and the evolution of collateral characteristics for both pool types. For example, Figure 8

shows that the FICO scores of the different pool types<sup>2</sup> have remained relatively stable over time suggesting that the underlying borrower base for the different mortgage products has not changed much over the period in consideration.

**Figure 8: Average Issue FICOs for Various Pool Types: 2004 - Current**

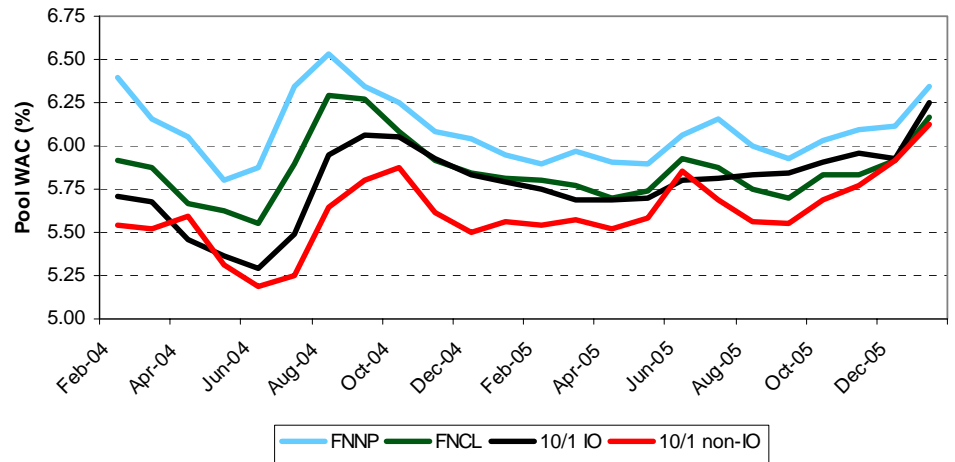


Source: Banc of America Securities

The relationship between the mortgage rates of these products is not as straightforward. Figure 9 shows that the mortgage rate differential between 30-year mortgages and 10/1s (both IOs and non-IOs) compressed substantially as the yield curve flattened over 2005. 10/20 mortgage rates have been higher than 30-year rates over the entire period but the spread differential has compressed by about 10bps. Given that these mortgages are somewhat shorter than 30-years, one would have expected the differential to increase – 10/20 rates should have trended with 10/1 rates. We can therefore conclude that rates on these mortgages have become more competitive as the market for this product has developed. The implication is, as Figure 9 makes clear, that the rate incentives experienced by the first generation of 10/20 borrowers were greater than those available to borrowers in some of the more standard products.

<sup>2</sup> The plot is controlled for loan size.

Figure 9: Average Issue WACs for Various Pool Types: 2004 - Current



Source: Banc of America Securities

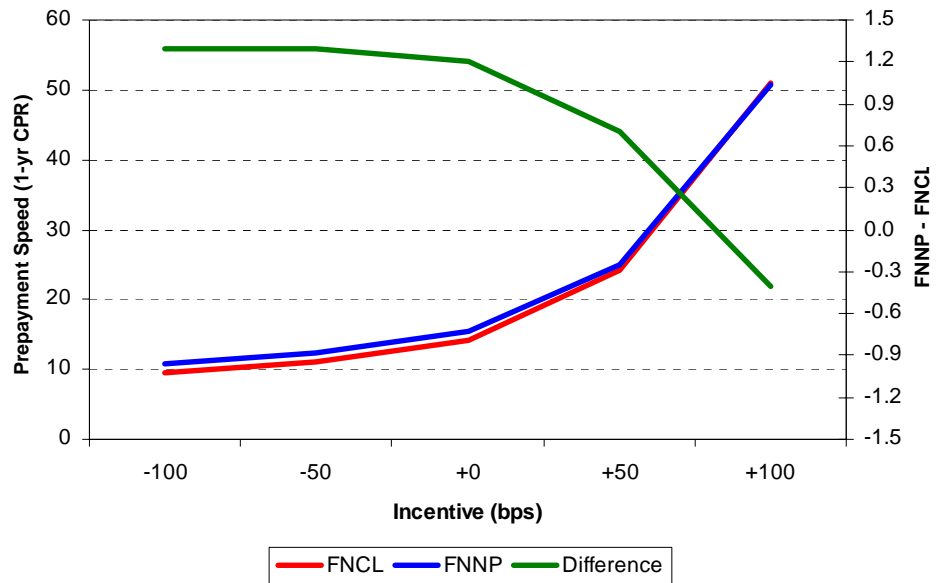
#### Summarizing:

- In the short-term prepayment speeds on 10/20 pools should continue to remain brisk but the mean-reverting nature of most housing markets suggests that over a longer period of time, we should start to see a convergence in prepayment rates over different pool types. Another form of mean-reversion may take place as the borrower base for 10/20s becomes more diversified over time and more “30-year like”.
- The credit characteristics of 10/20 borrowers appear to have remained relatively stable over the past two years. However, the first generation of 10/20 borrowers likely experienced greater refinancing incentives because competitive pressures lowered 10/20 rates relative to other mortgage products. This competition-driven tightening is likely to be less pronounced going forward.

#### Valuation of 10/20 Pools

The shortage of prepayment history on 10/20s implies that coming up with a prepayment model for these pools will involve a fair amount of guesswork. Our analysis above does suggest that a reasonable initial guess would be to assume that the 10/20 borrower is “hybrid-like” – they are likely to have shorter horizons than 30-years which will make them prepay faster in discount environments and slower in refinancing environments. Hence, our model assumes that 10/20 pools will prepay about 1% to 1.5% CPR faster in discount scenarios and about 0.3% to 0.5% CPR slower in a refinancing environment when compared to their amortizing 30-year counterparts. Figure 10 compares the prepayment response function assumed by our prepayment model for FNNP pools versus FNCLs.

Figure 10: Model Prepayment S-curves for FNCL and FNNP Pools



Source: Banc of America Securities

Given that the prepayment models for FNNP pools are going to be in an immature stage until we get a better perspective on the prepayment behavior of the 10/20 borrower, it is only reasonable to run FNNP pool valuations using both the FNNP and FNCL prepayment models. Figure 11 presents these calculations and shows valuation results for FNNP pools with different coupons. Each coupon has four calculations associated with it, each on a different row. The first row just shows TBA pricing and valuations for that coupon. The second row shows OAS calculations at current market pay-ups for FNNPs. Specifically, our calculations show that at current pay-up levels, FNNP pools pick up 8-12 bps OAS versus 30-years. The third row estimates the price of FNNP pools if they were to trade at the same OAS as FNCLs. Finally, the fourth row estimates the price of FNNP pools at the same OAS as FNCLs while using the FNMA 30-year prepayment model. All our calculations assume that the characteristics of the FNNP pools are the same as TBAs. In reality, FNNP pools might have slightly larger loan balances and higher GWACs, which could make FNNP pools worth up to 2-3 ticks less.

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**Figure 11: FNNP Pool Valuations Versus TBAs**

Security	Prepay Model	Price	OAS	Yield	WAL	EDur	LT %CPR
FNCL 5s	FNCL	95-02	-7.7	5.84	8.472	5.2	8.6
FNNP 5s	FNNP	94-14	0.8	5.962	8.267	5.6	10.2
FNNP 5s	FNNP	94-27	-7.7	5.89	8.267	5.5	10.2
FNNP 5s	FNCL	94-14	-7.7	5.88	9.345	5.7	8.6
FNCL 5.5s	FNCL	97-15+	-8.1	5.961	7.686	4.4	10.1
FNNP 5.5s	FNNP	96-27+	4.7	6.085	7.526	4.7	11.5
FNNP 5.5s	FNNP	97-11+	-8.1	5.988	7.526	4.5	11.5
FNNP 5.5s	FNCL	97-03	-8.1	6.003	8.373	4.7	10.1
FNCL 6s	FNCL	99-27+	-14.4	6.018	6.213	3.3	13.3
FNNP 6s	FNNP	99-11+	-2.9	6.129	6.114	3.5	14.6
FNNP 6s	FNNP	99-26	-14.4	6.03	6.114	3.3	14.6
FNNP 6s	FNCL	99-21	-14.4	6.064	6.668	3.5	13.3

All prices are as of 04/03/06 for 04/12 settlement.

All loan characteristics are assumed to be same for IO and amortizing mortgages.

Source: Banc of America Securities

Figure 12 summarizes just the pay-up information presented in Figure 11. Specifically, the results presented in the **FNCL Model Payup** column of the figure show equal OAS pay-ups for FNNP pools using the FNMA 30-year prepayment model. We can interpret these numbers as isolating the valuation impact of the slower scheduled amortization of IO products versus non-IO products. For example, deep-discount FNNP 5s suffer the most as a result of their slower scheduled amortization profile. The results presented in the **FNNP Model Payup** column show equal OAS pay-ups for FNNP pools using our FNNP prepayment model.

Based on the data presented in Figure 12, FNNP 6s look 14+ ticks cheap relative FNCL 6s. Similarly, FNNP 5.5s look 16 ticks cheap while FNNP 5s look 13 ticks cheap. Of course, FNNP pools have much less liquidity than FNCL pools and will suffer versus FNCLs if dollar rolls get special. However, both the liquidity and roll issues are not relevant for CMOs created off of FNNP collateral.

**Figure 12: Model and Market Payups for FNNP Pools versus TBAs**

Coupon	FNCL Model Payup	FNNP Model Payup	Market Payup
5s	-0-20	-0-07	-0-20
5.5s	-0-12+	-0-04	-0-20
6s	-0-06+	-0-01+	-0-16

Source: Banc of America Securities

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