Bank of America

The Ginnie Mae Primer

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- The home loans underlying Ginnie Mae (GNMA) single-family MBS pools are first-lien mortgages insured by one of the four government agencies: FHA, VA, PIH, or RHS. Since almost all FHA-insured loans are pooled in Ginnie Mae MBS, recent initiatives by the government to use the FHA program as a key policy tool to address some of the turmoil resulting from the collapse of the subprime lending industry along with regulatory attempts to modernize the FHA program have piqued interest in the Ginnie Mae MBS program. This primer provides a refresher on Ginnie Mae and its MBS programs.
- Ginnie Mae is a government owned corporation within HUD that was created in 1968 and is the guarantor of full and timely payment of principal and interest on approximately $390bb single-family MBS (as of August 2007). This guarantee is backed by the full faith and credit of the U.S. government. Ginnie Mae has two single-family MBS programs: GNMA I and GNMA II. The GNMA I program was established in 1970 and guaranteed the first mortgage-backed security. The GNMA II program was established later and provided more flexibility for issuers by relaxing pooling constraints.
- Ginnie Mae's share of MBS issuance is largely driven by the competitive position of the FHA/VA programs versus the private sector and also by changes in the Ginnie Mae MBS program. In recent years, the market share of Ginnie Mae plummeted as borrowers who would traditionally take out an FHA loan migrated to the alt-A and subprime sectors. The collapse of the subprime sector and the introduction of the *FHASecure* program should result in this migration reversing in 2008.
- Generally speaking, borrowers in Ginnie Mae pools tend to have lower loan sizes, higher LTVs and lower FICOs than borrowers in Agency pools. As a result, the prepayment behavior of Ginnie Mae pools can be quite different from that of Agency pools. Changes in the insurance program of FHA and VA can also impact borrower prepayment behavior. We provide an overview of the various factors that lead to differences between Agency and GNMA prepayment behavior.
- Servicers of GNMA I and II pools have the ability to "call" (or "buyout") delinquent loans at par from GNMA pools. Since a buyout is equivalent to a prepayment, we discuss how to account for the value of the buyout option in pricing GNMA pools.
- GNMA MBS passthroughs are usually quoted in terms of the price of GN/FN swaps. We provide an overview of the factors that typically drive the prices of these swaps and sketch a framework for assessing relative value in GN/FN swaps.

I. INTRODUCTION

An analysis of Ginnie Mae MBS starts with understanding the borrowers collateralizing Ginnie Mae pools. These borrowers would typically have problems getting their mortgage loans funded by the private market because of their high loan-to-value ratios, which are typically in excess of 95%, along with credit scores that are typically on the lower side. In many cases, these borrowers are first-time homebuyers or have a low- to medium-income profile and consequently do not have the financial wherewithal to put down a large down payment on a home. In order to understand why these borrowers have to rely on FHA or VA for lenders to extend them a mortgage, it is helpful to review how mortgage insurance works in the U.S.

Borrowers with higher loan-to-value (LTV) ratios typically have a higher propensity to default and the less equity a borrower has in their home, the higher the potential losses that a lender could incur in foreclosing and selling the property. Consequently, mortgage lenders protect themselves by requiring mortgage insurance (MI) when a borrower has an LTV ratio greater than 80%. In fact, by charter, Fannie Mae and Freddie Mac are not allowed to purchase a mortgage with an LTV over 80% without credit enhancement.[1] Generally, the higher the LTV, the greater the amount of insurance charged. Almost all insured single-family loans are insured by the FHA, VA, or private mortgage insurers. The insurance programs offered by these different institutions differ principally in the following dimensions:

- Maximum mortgage amounts and LTV ratios allowed;
- Underwriting standards;
- Funds required at closing for the down payment and closing costs;
- The percentage of the loss on a foreclosed loan that is covered by each organization.

The most important distinction for the purposes of our discussion is that FHA-insured and VA-guaranteed loans can have higher LTV ratios and are underwritten to less stringent credit guidelines than are loans covered by private mortgage insurance (PMI). The private-mortgage insurance industry is typically not very active in LTVs between 97%-100% because of the high risk associated with these loans. On the other hand, FHA allows LTVs as high as 97%-98%, while VA allows LTVs as high as 100%. In addition, the borrower's ability to finance closing costs and insurance premiums can increase the effective LTV beyond 100% sometimes.

Since almost all FHA-insured (and VA-guaranteed) loans are pooled in Ginnie Mae MBS, recent initiatives by the government to use the FHA program as a key policy tool to address some of the turmoil resulting from the collapse of the subprime lending industry along with regulatory attempts to modernize the FHA program have piqued interest in the Ginnie Mae MBS program. This primer provides a refresher on Ginnie Mae and its MBS programs. We discuss the role of Ginnie Mae and its guarantee, the Ginnie Mae MBS programs, the prepayment behaviour of Ginnie Mae MBS with a detailed analysis of the buyout option available to servicers on Ginnie Mae pools, and provide a roadmap for assessing relative value in Ginnie Mae MBS. Two appendices provide some background details on FHA and VA.

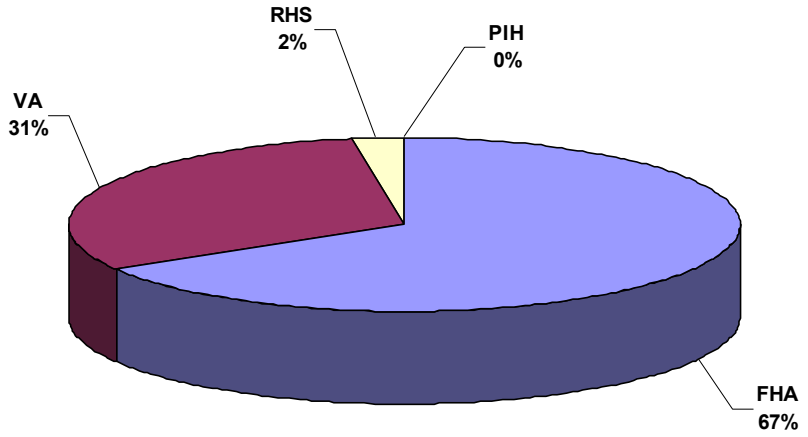
[1] Three types of credit enhancement are available to the GSEs to meet this requirement: mortgage insurance, repurchase agreements, or lender participation in the mortgage.

II. THE GINNIE MAE SINGLE-FAMILY MBS PROGRAM

An Overview of Ginnie Mae

The Government National Mortgage Association (Ginnie Mae or GNMA) is a government owned corporation within the Department of Housing and Development (HUD) that was created in 1968 and is the guarantor of full and timely payment of principal and interest on approximately $390bb single-family MBS.[2] This guarantee is backed by the **full faith and credit of the United States**. In other words, Ginnie Mae securities offer the same credit quality as U.S. Treasuries. While there are several components to Ginnie Mae's mission, from the perspective of MBS investors the most important one (apart from the explicit government guarantee) is that Ginnie Mae-guaranteed MBS are the dominant source of capital markets financing for mortgage loans insured or guaranteed by the following Federal housing institutions: the Federal Housing Administration (FHA), the Department of Veterans Affairs (VA), the Rural Housing Service (RHS), and the Office of Public and Indian Housing (PIH). As Figure 1 shows, FHA- and VA-backed loans dominate the composition of Ginnie Mae MBS, with RHS and PIH-backed loans having a negligible presence. Not only do Ginnie Mae MBS consist mostly of FHA and VA loans but, in addition, almost all FHA and VA-backed mortgages end up in Ginnie Mae MBS. Over the years, approximately 90% of all FHA and VA loans have been securitized in Ginnie Mae MBS.[3]

Figure 1: Distribution of Programs Within Single-family Ginnie Mae MBS*



*Based on outstanding balances as of August 2007. Excludes manufactured housing.
Source: Banc of America Securities

[2] As of August 2007. Ginnie Mae also guarantees MBS backed by multifamily construction and project loans and by manufactured housing loans. Less than 10% of the loans backing GNMA MBS fall into this category.
[3] Since the overwhelming majority of loans in Ginnie Mae pools are backed by FHA or VA, Appendix A offers an overview of FHA and VA. In terms of the distinction between FHA "insurance" versus the VA "guarantee", FHA explicitly charges a mortgage insurance fee whereas VA just charges a funding fee to guarantee loans and this is probably why FHA loans are "insured" while VA loans are "guaranteed."

Ginnie Mae and the Secondary Market

As a participant in the secondary mortgage market, Ginnie Mae does not buy or sell loans or securities. Rather, Ginnie Mae guarantees timely payment of principal and interest on its MBS to investors regardless of whether the underlying homeowners make their mortgage payments or the issuer (typically the lender or its affiliates) makes timely payments on the MBS. As stated above, this Ginnie Mae guarantee is backed by the U.S. government.

Since the loans that are pooled into Ginnie Mae MBS are either guaranteed or insured by the Federal government through the FHA, VA, RHS and PIH programs, it is worth understanding what incremental protection the Ginnie Mae guarantee provides. The extra value from the Ginnie Mae guarantee comes from the fact that the various Federal Housing programs listed above either partly or fully cover the ultimate payment of principal[4] on the underlying mortgages, whereas Ginnie Mae guarantees that security holders will get full and timely payments of principal and interest on their MBS at all times, including the period when the underlying homeowners in a Ginnie Mae MBS are delinquent. Note that the Federal Housing agency guarantees are at the loan level whereas the Ginnie Mae guarantee is at the MBS level.

In practice, if a homeowner in a Ginnie Mae MBS is delinquent, Ginnie Mae only comes into the picture if the issuer defaults since the issuer of the MBS has the responsibility to forward payments from mortgagors to MBS investors. The issuer is compensated for these advances by the relevant housing agency (FHA, VA, RHS or PIH).[5]

Ginnie Mae charges issuers a guarantee fee of 6bps on single-family MBS for providing its guarantee of full and timely payment. In addition to guarantee fees, issuers also pay a commitment fee that gives them the authority to pool mortgages into Ginnie Mae MBS.

Understanding Ginnie Mae's Finances

To round out our picture of Ginnie Mae, it is useful to understand how this government agency supports itself. The capital to finance Ginnie Mae's operations comes from the excess of revenue over expenses and Ginnie Mae does not receive any federal appropriations or borrow money. The majority of Ginnie Mae's MBS program revenues (~96% in 2006) come from guarantee and commitment fees. The other major source of income is interest income since Ginnie Mae invests the excess of its revenues over expenses in U.S. Government securities. On the expenses front, apart from MBS program and administrative expenses, Ginnie Mae incurs expenses through acquiring the portfolios of defaulted issuers and setting up loss reserves to absorb potential future losses from these defaulted issuer portfolios.

GNMA I and GNMA II MBS

Ginnie Mae has two MBS programs: GNMA I and GNMA II. The GNMA I program was established in 1970 and guaranteed the first mortgage-backed security. The GNMA II program was established later and provided more flexibility for issuers by relaxing some of the constraints associated with what ranges of mortgage note rates could be pooled in a Ginnie

[4] Briefly, the coverage provided through the FHA, VA, RHS and PIH programs vary with the FHA and PIH program covering nearly 100% of the unpaid principal balance, VA covering 25% to 50%, depending on the size of the loan, and RHS guaranteeing up to 90% of the loan value. In addition, some interest payments may also be covered. See Appendix A for details on the FHA and VA insurance/guarantee programs.

[5] See Appendix A and B.

Mae pool with a specific coupon. We provide a brief summary of the key characteristics of these two MBS programs.

The GNMA I MBS Program

Mortgage pools issued through the Ginnie Mae I program must satisfy a number of requirements:

- The underlying mortgage loans must be guaranteed or insured by FHA, VA, RHS, or PIH.
- The loans backing a Ginnie Mae I pool must be originated by a single issuer. These issuers have to be approved by Ginnie Mae.
- The underlying mortgages in a Ginnie Mae I pool all have the same interest rate. In other words, there is no WAC dispersion in Ginnie Mae I pools.
- Single-family Ginnie Mae I pools have a 50bps guaranty and servicing fee (44bps servicing and 6bps guarantee), so the net coupon paid by the MBS is always exactly 50bps below the interest rate paid by the borrower. In other words, all homeowners in a Ginnie Mae I 6.5% pool would have a mortgage rate of 7%.

The GNMA II MBS Program

The Ginnie Mae II MBS program was introduced in 1983 and streamlines some of the paperwork for issuers and security holders. Some of the requirements for GNMA II pools are:

- The underlying mortgage loans must be guaranteed or insured by FHA, VA, RHS, or PIH.
- Greater flexibility with respect to loan characteristics: coupon rates on the underlying mortgages can vary between 25 to 75bps above the interest rate on the pool.[6]
- The minimum servicing fee for each Ginnie Mae II pool will be 19bps.
- Mutliple-issuer as well as single-issuer pools are permitted under the program:
    - An issuer may participate in the Ginnie Mae II MBS program either by issuing single-issuer pools or through participation in the issuance of multiple-issuer pools. A **custom pool** has a single issuer that originates and administers the entire pool.
    - A multiple issuer pool typically combines loans with similar characteristics. The resulting pool backs a single MBS issue and each participant is responsible for administering the mortgage loans that it contributes to the pool.
- The Ginnie Mae II MBS program allows small issuers who do not meet the minimum dollar pool requirements of the Ginnie Mae I MBS program to participate in the secondary mortgage market.
- FHA and VA ARMs are securitized through the Ginnie Mae II program.

[6] Prior to July 1st, 2003, the spread of note rates was 50-150bps above the MBS coupon.

- Builder buydown loans may be no more than 10% of the original principal balance of a multi-issuer pool.[7] Buydown loans may be up to 100% of the original principal balance of a Ginnie Mae II Custom Pool; however, any pools in which Buydown loans exceed 10% of the original principal balance must be denoted as "BD" pools (similar to the convention for GNMA I Buydown pools).

Figure 2 and Figure 3 summarize the key similarities and differences between the Ginnie Mae I and II MBS programs. The key similarities are:

(1) Both MBSs are collateralized by government-insured or guaranteed loans from FHA, VA, RHS or PIH. Thus, the underlying homeowners in GNMA I and II pools are very similar; and,

(2) Both are backed by the full faith and credit of the U.S. Government.

The key differences are:

(1) The coupon range for the underlying mortgages; and,

(2) The payment delay.

Figure 2: Similarities Between the Ginnie Mae I and II MBS Programs

Characteristic	Similarities
Issuer	Mortgage lenders approved by Ginnie Mae
Securities	Pass-through monthly payment of principal and interest
Underlying Mortgages	Government-insured or guaranteed loans
Maturity	Maximum 30 years for single family mortgages
Guarantee	Full and timely payment of principal and interest
Guarantor	Ginnie Mae (full faith and credit of the U.S. Gonverment)
Paying Agent	Investor payments made monthly by the issuer or Ginnie Mae's agent
Minimum Certificate Size	$25,000

Source: Banc of America Securities

Figure 3: Differences Between the Ginnie Mae I and II MBS Programs

Characteristic	Ginnie Mae I	Ginnie Mae II
Issuers per pool	Single	Single (custom) or multi-issuer
Eligible mortgages	Rate buydown loans not permitted	Rate buydown loans permitted
Interest rate on underlying mortgages	50bps above pass-through rates; all mortgages in a pool have same rate	25bps to 75bps above pass-through rate
Payment Delay	45 days	50 days
Payment Date	15th of the month	20th of the month
Minimum pool size	$1 million	$500K multi-issuer, $1mm custom

Source: Banc of America Securities

[7] A builder buydown loan is a mortgage loan on newly developed property that the builder subsidizes during the early years of the development. The builder uses cash to buydown the mortgage rate to a lower level than the prevailing market loan rate for some period of time. The typical buydown is 3% of the interest rate amount for the first year, 2% for the second year, and 1% for the third year (also referred to as a 3-2-1 buydown).

Despite the flexibility provided by the Ginnie Mae II program, the Ginnie Mae I MBS program remains slightly more liquid at the time of writing. Out of all outstanding Ginnie Mae single-family MBS, 55% are Ginnie Mae Is. The gap between the two programs has attenuated over the past few years with the change in the pooling requirements of the Ginnie Mae II MBS program effectively allowing issuers more flexibility in terms of how much servicing they have to retain. Finally, as Figure 4 shows, the most common mortgage product securitized in Ginnie Mae MBS is by far 30-year mortgages, followed by 15-years, 1/1 ARMs and 3/1 Hybrid ARMs.

Figure 4: Distribution of Mortgage Product Types in Ginnie Mae MBS*

PRODUCT TYPE	OUTSTANDING BALANCE ($bb)	%
30-Year Fixed	348.1	90%
20-Year Fixed	0.5	0%
15-Year Fixed	15.1	4%
30-Year Fixed Buydown	1.7	0%
1/1 ARM	12.7	3%
3/1 Hybrid ARM	10.0	3%
5/1 Hybrid ARM	0.5	0%
7/1 Hybrid ARM	0.0	0%
10/1 Hybrid ARM	0.0	0%
	388.7	

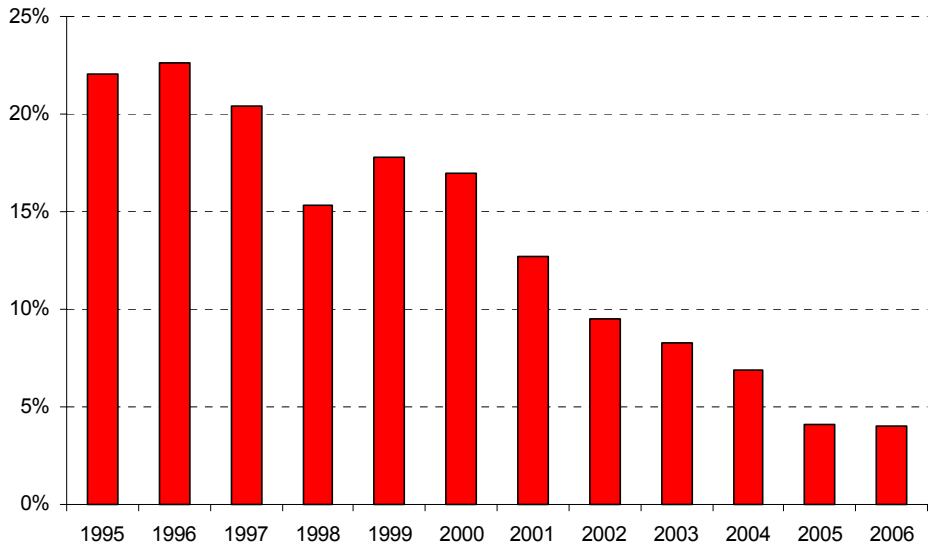
*Based on outstanding balances as of August 2007. Excludes manufactured housing.

Source: Banc of America Securities

III. A BRIEF HISTORY OF THE GINNIE MAE MBS SECTOR

Given our working understanding of Ginnie Mae and its MBS programs, we now take a look at the role Ginnie Mae MBS have played in the residential mortgage market over the past decade. The importance of Ginnie Mae is, of course, directly proportional to its market share, which we track here as the (percentage) share of Ginnie Mae issuance in all MBS issuance (see Figure 5). Clearly, the most noticeable trend in the figure is the sharp decline in the market presence of Ginnie Mae over the period represented in the graph, with a particularly noticeable downshift occurring after 2000. As a government agency that securitizes government-backed loans, changes in Ginnie Mae's share of the MBS market are driven both by the competitive position of the FHA/VA programs versus the private sector and also by changes in the Ginnie Mae MBS program. We briefly discuss the impact of both these types of changes on Ginnie Mae's market share.

Figure 5: Historical Trends in the Ginnie Mae Share of Total MBS Issuance



Source: Banc of America Securities analysis of Inside MBS&ABS data.

MBS Program Changes

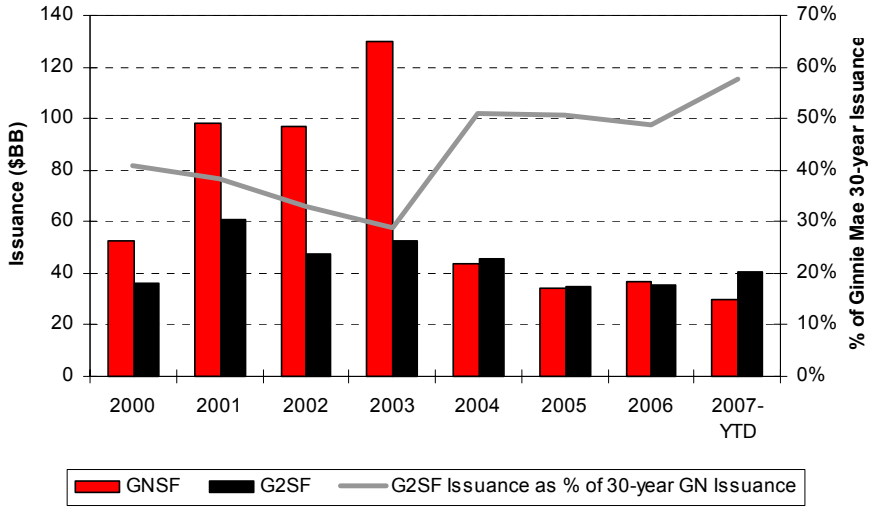
MBS program changes typically haven't played a major role in reshaping Ginnie Mae's role in MBS issuance although that may change in 2008 with the introduction of the *FHASecure* program. The key program changes over the past few years are:

- **Changes in Ginnie Mae II Pooling Rules.** As discussed in Section I, Ginnie Mae II MBS pooling conventions were relaxed in July 2003 which increased the market share of Ginnie Mae II MBS relative to Ginnie Mae I MBS (see Figure 6).
- **Changes in Buyout Policy.** Subject to certain restrictions, servicers have the ability to "call" (or "buyout") delinquent loans at par from GNMA pools. While changes to the buyout policy have probably not had much of an impact on Ginnie Mae's market

share, they have influenced the prepayment behavior of GNMA MBS since a buyout is equivalent to a prepayment. Section V offers a detailed discussion of this important topic.

- **Changes in Loan Limits**. For pools issued on or after September 1st, 2007, Ginnie Mae will no longer limit the size of VA loans to the conforming loan limit. Ginnie Mae requires the amount of the borrower's down payment plus the amount of the available VA guaranty (25% of the loan balance up to a maximum of $60,000 in this context) to be at least 25% of the home value. Since most VA borrowers do not have the financial wherewithal to put down any kind of down payment, this change is unlikely to meaningfully affect Ginnie Mae issuance.
- **Introduction of the *FHASecure* Program and Ginnie Mae MFS Pools.** On August 31st, President Bush introduced the *FHASecure* program for qualifying subprime ARM borrowers who have become delinquent on their mortgage payments as a direct result of a higher mortgage rate after the rate reset.[8] A Ginnie Mae M FS ("MFS" for short) pool is a new multi-issuer pool type which will be collateralized by *FHASecure* loans and by conventional-to-FHA refinance loans with subordinated second liens. The issuance of Ginnie Mae MFS pools is expected to average at least $1bb a month in 2008.

Figure 6: Historical Trends in the Ratio of Ginnie Mae I to Ginnie Mae II 30-year MBS Issuance



Source: Banc of America Securities analysis of Inside MBS&ABS data.

FHA Market Share Changes

Changes in FHA's market share of single-family mortgage loans directly impact Ginnie Mae's MBS issuance. The table in Figure 7 provides a historical perspective on this metric and also illustrates the declining market share of FHA from 9% in 1999 to 2% in 2006. There actually appear to be two phases to this loss in market share. As the table shows, from 1999 to 2003,

[8] A detailed discussion of the *FHASecure* program can be found in our September 21st Trading Strategy weekly.

the FHA sector lost market share to the conforming market. However, from 2003 to 2006, it appears as if the FHA lost market share to the Subprime and alt-A sectors.

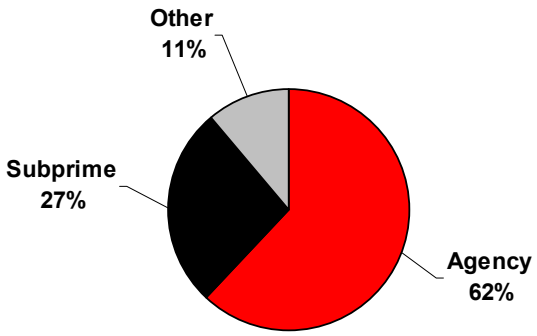
Figure 7: Market Share of Different Sub-sectors in the Residential Mortgage Market*

Year	FHA	Conventional	Alt-A	Subprime
1999	9%	53%	2%	11%
2000	8%	56%	3%	11%
2001	6%	58%	3%	5%
2002	5%	59%	2%	6%
2003	4%	62%	2%	8%
2004	3%	41%	6%	18%
2005	2%	35%	12%	20%
2006	2%	33%	13%	20%

*Our estimate of market share is based on the dollar volume of residential single-family originations including first- and second-liens
Source: Banc of America Securities analysis of Inside MBS&ABS data.

These perceptions are confirmed by a survey of FHA lenders carried out by the MBA. Basically, the lenders attribute the loss in FHA's market share over the past 6 or 7 years to the conforming, alt-A, and subprime sectors in the proportion shown in Figure 8. The lenders view the loss of FHA market share to the conforming sector as being relatively permanent, while the loss of share to the alt-A and Subprime markets is viewed as being more cyclical and dependent on the credit spread between Subprime and FHA mortgage rates. Attributing 27% of FHA's "Lost Market Share" from 1999 to 2006 to Subprime equates to approximately 2 points of market share.

Figure 8: Percentage of FHA "Lost Market Share" Taken Up By the Following



Source: MBA

Ginnie Mae and the Subprime Sector

An interesting ripple effect of the contraction in subprime lending seen over 2007 with subprime volumes down by approximately 70% year-over-year, is the potential impact on the

Ginnie Mae sector. The gist of the issue is that the FHA and Subprime market "overlap" in the sense that they both serve a common pool of borrowers with imperfect credit histories, lower incomes and a limited ability to put down a large down payment on their home. In fact, as discussed above, there is strong evidence that some of the growth in the Subprime sector in recent years was fuelled by borrowers who would have ordinarily taken out FHA loans. Given the fact that a number of originators are severely curtailing their subprime lending activities, the question is whether some of these borrowers will now take out FHA loans. Subprime borrowers can come to the FHA sector either through the purchase market or by refinancing their existing loans. In particular, there is a large volume (~$400 billion) of 2/28 Subprime ARM borrowers resetting in 2008 that need to refinance to lower their payments. The Subprime market is now large enough relative to the Ginnie Mae sector that a transfer of market share to the FHA sector could lead to a meaningful increase in Ginnie Mae supply. In fact, the introduction of the *FHASecure* program as a way of facilitating refinancings for subprime borrowers who are having trouble making their mortgage payments because of rate resets is expected to increase Ginnie Mae MBS supply by at least $1bb a month in 2008.

IV. GINNIE MAE COLLATERAL AND PREPAYMENT BEHAVIOR

We now turn to focusing on the pricing and valuation of Ginnie Mae MBS. We begin by analyzing the prepayment behavior of the underlying homeowners. In this context, we need to understand what types of borrowers end up in FHA/VA pools compared to Agency pools and what implications this borrower base has for the prepayment behavior of Ginnie Mae MBS relative to FNMA and FHLMC-guaranteed MBS.

As discussed in Section I, the home loans underlying GNMA single-family pools are first-lien mortgages insured by one of four government agencies: FHA, VA, PIH, or RHS.[9] FHA-insured mortgages constitute the majority of GNMA collateral (see Figure 1). At a big picture level the FHA single-family mortgage program targets:

- First-time homebuyers not able/willing to put a lot of money down on a house;
- Lower- and medium-income borrowers not able/willing to put a lot of money down on a house;
- Borrowers with impaired credit histories who do not qualify under the standard Fannie Mae/Freddie Mac credit history criteria;
- Borrowers financing less than 95% of the median house price in an area.[10]

The second-biggest contribution to Ginnie Mae collateral comes from mortgages guaranteed by VA. These loans are available to qualified veterans and have the following features:

- Up to 100% financing is allowed;
- Credit history standards are much more relaxed compared to standard Fannie/Freddie criteria;
- Currently, there is no loan size limit for loans pooled in GNMA securities (prior to September 1st, 2007 there was a loan size limit equal to the conforming loan limits).

These broad guidelines should be compared to the standard Fannie Mae/Freddie Mac underwriting guidelines where loans generally have at least a 20% down payment and are made to borrowers with good credit histories. Loan size limits for these borrowers are the "conforming" loan limits and are currently higher than those for the FHA program. To complement these broad statements about conventional and government borrowers, we take a detailed look at the collateral characteristics of Ginnie Mae and Fannie Mae 30-year MBS issued in 2006.

Original Loan-to-Value

As shown in Figure 9, the average original loan-to-value ratio (OLTV) for GNMA 30-year fixed-rate pools issued in 2006 was 93% compared to 74% for 30-year fixed-rate FNMA pools. The average OLTV is much higher for GNMA than for FNMA because GNMA programs

[9] Our discussion of PIH- and RHS-insured loans in what follows is fairly limited since they contribute less than 3% to GNMA issuance.
[10] Subject to a floor of 48% of the conforming loan limit and a cap of 87%.

specifically target high-LTV borrowers who would not be able to get financing through the traditional Fannie/Freddie programs, or would get much less favorable terms under those programs. In fact, very few GNMA pools have OLTVs less than 90% and almost no pools have OLTV less than 80%, showing that the GNMA borrower is typically highly leveraged.

In contrast, 85% of Fannie pools issued in 2006 had OLTVs of not more than 80%, reflecting the fact that Fannie Mae borrowers typically put at least 20% down since this is required to obtain the most favorable mortgage terms.

Figure 9: Original LTV Distributions for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Mean Original LTV	**93%**	**74%**
LTV<70%	0%	19%
LTV>=70% and LTV<80%	0%	66%
LTV>=80% and LTV<90%	4%	12%
LTV>=90%	92%	3%
LTV N/A	4%	0%

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Credit Scores

Ginnie Mae currently does not release credit score information on its pools. Our estimate uses a loan level database of FHA/VA loans and shows that the average FICO score for GNMA loans is in the 650s, with FHA-insured loans having scores in the 640s and VA-guaranteed loans having scores in the 680s (Figure 10). The average FICO score for the FNMA borrower is much higher and is in the high 710s. The large difference in FICO scores between FNMA and GNMA loans is especially evident if we note that only 4% of FNMA pools have FICO scores less than 675.

Such large differences in FICO scores are not surprising given that FHA in large part targets first-time homebuyers and low-income borrowers who tend to have worse than average credit histories. Both FHA and VA have much more relaxed credit history criteria compared to FNMA, which itself primarily targets prime borrowers who have no serious blemishes in their credit histories.

Figure 10: Credit Score Distributions for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Mean Original FICO	**650s (FHA: 640s, VA: 680s)**	**718**
FICO<650	0%	2%
FICO>= 650 and FICO < 675	0%	2%
FICO>= 675 and FICO < 700	0%	10%
FICO>= 700 and FICO < 725	0%	43%
FICO>= 725 and FICO < 750	0%	40%
FICO>=750	0%	3%
FICO N/A	100%	0%

Source: McDash, Fannie Mae, Banc of America Securities

Loan Size

As discussed earlier, in 2006, VA-guaranteed loans were subject to the conforming loan limit, while FHA loan limits were between 48% to 87% of the conforming loan limit. Therefore, it is not surprising that FHA loan sizes are on average lower than both VA and FNMA loan sizes. It turns out that VA loan sizes are on average lower than FNMA loan sizes, probably due to the correlation between the loan size and the quality of the borrower's credit profile (see Figure 11).

Figure 11: Average Loan Sizes for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Average Original Loan Size	**142K**	**185K**
Average Original Loan Size by Program		
FHA	132K	
VA	178K	
RHS	99K	
PIH	136K	

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Geographic Distribution

Given the lower loan sizes for GNMA pools it is not surprising that GNMA loans are more concentrated in states with lower housing costs. As shown in Figure 12, Texas contributed the most (11%) to GNMA 2006 issuance, while California contributed the most (12%) to Fannie Mae 2006 issuance.

Figure 12: Geographic Concentrations for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Geographic Concentrations (%)		
CA	1%	12%
TX	11%	5%
NY	3%	4%
FL	6%	9%
IL	4%	5%
PA	2%	3%
Rest	73%	62%

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Loan Purpose

GNMA does not report loan purpose for a large fraction of its collateral (for 43% of balance issued in 2006), while FNMA reports loan purpose for almost all its loans. Among those loans with loan purpose reported, a higher fraction is purchase for GNMA than for Fannie Mae. For example, 63% of 2006 GNMA issuance that had loan purpose reported was for home purchase compared to 54% for FNMA (see Figure 13). This is not surprising given that in large part FHA and VA target homebuyers purchasing their first home. In addition, those GNMA borrowers that refinance may do so into Fannie/Freddie programs provided they have built up enough equity in their homes or have sufficiently improved their credit histories. Refinancing from an Agency program into GNMA would be more unusual.

Figure 13: Loan Purpose Distributions for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Loan Purpose (%)		
Purchase	35%	54%
Refinance	21%	46%
Not Reported	44%	0%

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Property Type

The single-family programs of GNMA and FNMA allow pooling of mortgages secured by one-to-four unit properties. Among those loans reporting property type, one-unit dwellings accounted for 96% of FNCL issuance in 2006, compared with 97% for GNSF. We note that reporting of property type in GNMA pools is very incomplete as seen in Figure 14.

Figure 14: Property Type Distributions for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Property Type (%)		
Single Family	66%	96%
2-4 Unit	2%	4%
Not Reported	33%	0%

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Occupancy Type

GNMA does not report occupancy type for its pools. However, both FHA and VA generally do not allow mortgages secured by non-owner occupied properties, except for a few very limited exceptions. Therefore, the vast majority of GNMA mortgages are for owner-occupied (primary) residences. FNMA, on the other hand, actively insures/securitizes mortgages for second homes and investor properties. For example, in 2006, about 5% of 30-year FNMA issuance was secured by second homes and 6% by investor properties.

Figure 15: Occupancy Type Distributions for 30-year Fixed-rate Collateral Issued in 2006

	GNMA	FNMA
Occupancy (%)		
Owner Occupied	>99%*	88%
Second Home	<0.5%*	5%
Investor	<0.5%*	6%

*BAS Estimate

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Mortgage Rates

In general, FHA and VA mortgage rates are not substantially different from conforming mortgage rates, as illustrated in Figure 16. The figure shows the average mortgage rate (gross coupon) for GNMA and FNMA 30-year fixed-rate pools year by year. The difference between the average mortgage rates that GNMA and FNMA borrowers were obtaining in each of the last 8 years was never more than 25bps. Our loan-level study using the McDash mortgage database shows that FHA borrowers on average pay slightly higher mortgage rates than VA borrowers (after controlling for loan origination date).

Figure 16: Average Gross Coupons at Origination for 30-year Fixed-rate Collateral

	Average GWAC (%)		
Orig. Year	GNSF	FNCL	Differential (bps)
2007	6.35	6.39	-4.4
2006	6.45	6.57	-12.8
2005	5.86	5.92	-5.8
2004	6.03	5.96	7.4
2003	5.92	5.83	9.1
2002	6.78	6.57	20.9
2001	7.21	7.06	14.9
2000	8.37	8.12	25.0

Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Comparing Prepayments on Ginnie Mae versus Fannie Mae MBSs

Armed with a detailed understanding of the difference between borrower characteristics for GNMA and FNMA pools, we have a foundation for understanding prepayment differentials between these two MBS programs. Let's start comparing GNMA and FNMA prepayment characteristics by examining historical prepayment data on 30-year fixed-rate mortgages originated in 1998 (Figure 17). The 1998 cohort is interesting to study because it is a large cohort that experienced both a significant backup and a rally in mortgage rates, in 2000 and 2002-2003, respectively.

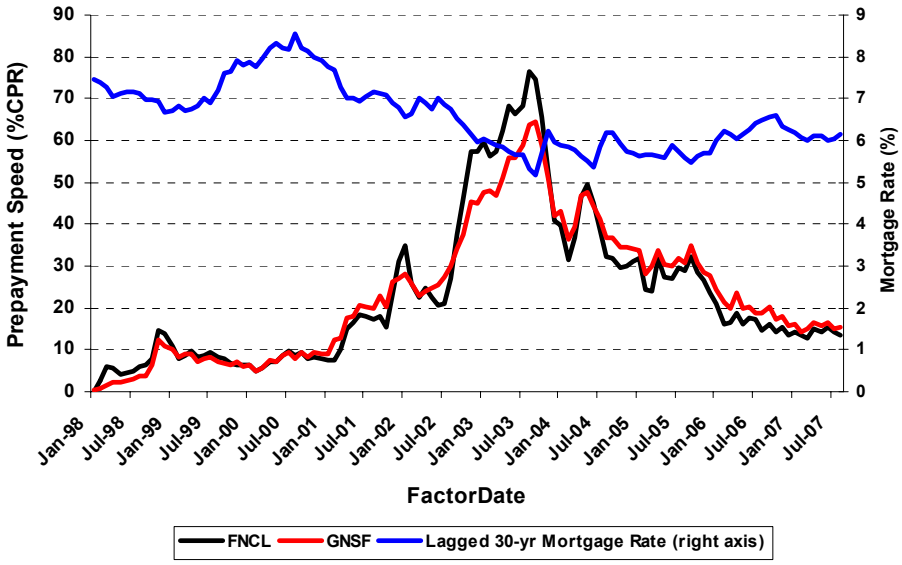
During the backup in mortgage rates in 2000 when rates were 100-150bps higher than in 1998, the cohort had no incentive to refinance and prepayments were mostly caused by housing turnover (defaults and curtailments contributed very little on a relative basis). At that time, both FNMA and GNMA pools were prepaying at very similar levels, with the lows in speeds at 5%-6% CPR during the winter months and the highs at 8%-10% CPR during the summer, reflecting the seasonal pattern of home sales. This demonstrates that over this period the base housing turnover rate for the GNMA and FNMA borrower was rather similar.

In late 2000, mortgage rates rallied back to their levels of 1998 (around 7%) and remained in a relatively narrow range around 7% through 2001. Even though at these levels mortgage rates did not present a significant opportunity for rate-term refinancings, prepayment speeds picked up to the high teens - low 20s for both FNMA and GNMA pools, with GNMAs prepaying about 3% CPR faster than FNMAs. The pickup in speeds is probably explained by an increase in cashout refinancings: In 2001, the 1998 cohort had its first good opportunity to cash out home equity accumulated during the preceding 3 years (U.S. house prices rose at an annual average of 6.3% over these 3 years). The reason for GNMA prepaying 3% CPR faster than FNMA is probably twofold: first, the GNMA borrower is in general more cash strapped and more prone to cashing out home equity; second, those FHA borrowers that could refinance out of an FHA mortgage into a conventional mortgage had an additional incentive to do so in order to eliminate the annual 50bp FHA mortgage insurance premium. Overall, prepayments of the 1998 cohorts in 2001 showed that given a significant build up of equity, GNMAs will prepay several CPR faster than FNMAs in at-the-money situations.

During the refinancing wave of late 2002 – 1H 2003 when mortgage rates rallied 100–150bps below their levels in 1998, the 1998 FNMA cohort was consistently prepaying significantly (8%–12% CPR) faster than GNMA. For example, at the peak of the refinancing wave in July 2003, the FNMA cohort prepaid at 76% CPR compared to 64% CPR for GNMA. The reason

for faster FNMA prepayments during this period is that FNMA borrowers are in general more financially sophisticated and face lower hurdles to refinancing compared to GNMA borrowers. Consequently, FNMAs prepay at higher rates when refinancing incentives are very high and prepayment rates are dominated by rate/term refinancings. Another factor that contributed to faster FNMA speeds was the larger average loan size associated with FNMA borrowers ($126K compared to $99K for GNMA). Given the same rate incentive, borrowers with larger loan balances tend to refinance their mortgages at faster rates due to a larger per month dollar savings from refinancing.

Figure 17: Historical Prepayment Speeds on 1998 Origination 30-year Fixed-rate GNMA and FNMA Pools



Source: Ginnie Mae, Fannie Mae, Banc of America Securities

To summarize, the prepayment experience of 1998 GNMA and FNMA cohorts exposes several distinctive features of GNMA prepayment behavior:

- The GNMA borrower is generally more stretched financially and more prone to cashing out home equity; this drives up prepayments on slightly out-of-the-money, at-the-money and in-the-money pools when the underlying homeowners have accumulated enough home equity;
- The GNMA borrower will rate/term refinance less actively given the same rate incentive, in part due to limited refinancing options and lower loan sizes;
- When mortgage rates are much higher (by 100 – 150bps or more) than mortgage gross coupons, prepayment rates for GNMA and FNMA collateral can be similar (at least when prepayments are dominated by housing turnover).

Having gone through the above introductory example we now provide a more detailed analysis of the factors driving the differences between GNMA and FNMA prepayments.

Explaining the Differences Between GNMA and FNMA Prepayments

The key factors driving the differences in GNMA and FNMA prepayment behavior and their effects can be summarized as follows:

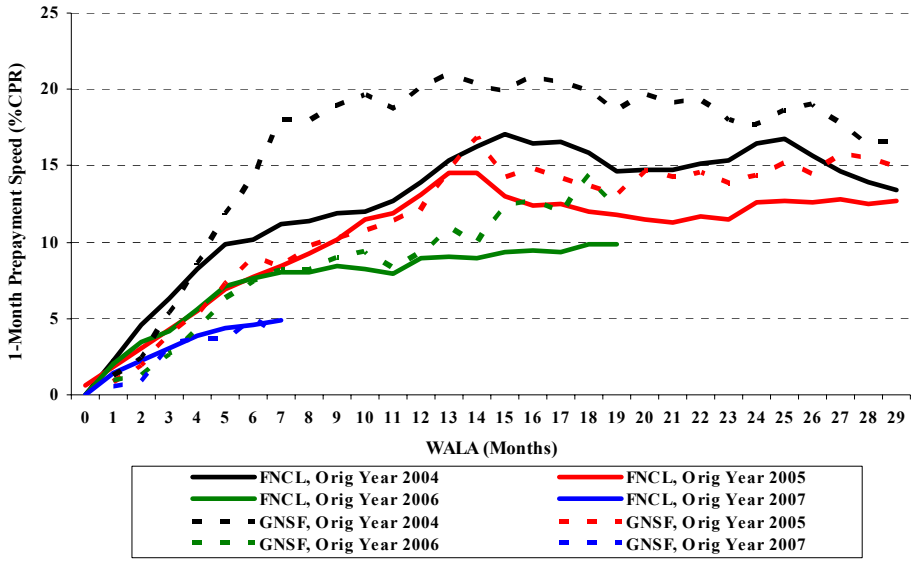
- The GNMA borrower is more prone to cashout refinancing than FNMA borrower. This leads to faster GNMA speeds in slightly out-of-the-money and at-the-money situations when housing appreciation rates are moderate or high, and the underlying mortgage loans have more than about 12 months of seasoning. Deeper in-the-money (up to 50-100bp rate incentive) GNMA speeds may also be faster than FNMA in a very robust housing market. In general, GNMA prepayments are more correlated to HPA rates than FNMA prepayments.
- The increase in home equity due to positive HPA can also make many FHA borrowers eligible for rate/term refinancing out of their FHA mortgage into an agency mortgage program. The incentive for these borrowers to refinance out of FHA comes from the ability to eliminate the annual 50bp FHA mortgage insurance premium.
- In addition to eliminating the 50bp FHA annual premium, FHA mortgages endorsed for insurance before December 8, 2004 may have an additional incentive to refinance out of FHA program because the prepayment may make the borrower eligible for a refund of a portion of the 1.5% upfront insurance premium paid to FHA at loan origination.
- Credit curing also contributes to faster GNMA speeds since the credit profile of many GNMA borrowers improves over time as the borrowers establish a history of regular mortgage payments and the borrowers become eligible to refinance out of FHA program. Credit curing-related refinancings typically start when loans are seasoned more than a year.
- Deep in-the-money (at 100–150bps or higher rate incentives) FNMA pools usually prepay faster than GNMAs since in this regime prepayment rates are dominated by rate/term refinancings where the FNMA borrower exercises their refinance option more efficiently.
- In a slow HPA environment, GNMA prepayments can slow down significantly especially for slightly out-of-the-money and at-the-money pools, but GNMAs may still prepay faster than FNMAs in these regimes due to credit curing and the other causes listed here.
- The large difference in geographical concentrations between GNMA and FNMA pools creates different exposures to local housing market conditions. In the same vein, any changes in state and local mortgage-related laws and regulations will affect GNMA and FNMA prepayments to a different degree.
- The GNMA prepayment profile is more often altered by policy changes since FHA, VA or GNMA typically change their policies more often than FNMA. For example, the rules for refunding the FHA up-front insurance premiums have changed twice in the last 7 years, each time modifying the economic incentive for prepaying an FHA-insured mortgage.
- The default component of prepayment speeds is higher for GNMA collateral because GNMA default rates are generally higher. However, in most circumstances, defaults

are not a major component of prepayment speeds.

- Higher GNMA delinquency rates affect GNMA prepayments in a unique way due to the presence of the servicer buyout option for loans that are seriously delinquent. The buyout option is usually exercised for premium loans but a servicer may be forced to buyout discount loans as well if the overall level of delinquencies for the servicer is above certain GNMA limits. Therefore, in a severe housing/economic downturn, GNMA premiums may prepay very fast. Buyouts are a very important part of understanding GNMA prepayment behavior and are addressed in a separate section (Section V).
- FHA and VA mortgages are assumable under certain conditions which may decrease prepayments due to housing turnover when pools are deeply out-of-the-money and home prices are increasing very slowly. The second factor is an issue because most FHA and VA borrowers are too cash-strapped to put down a large down payment on a FHA or VA loan (see Figure 9).
- The GNMA II single-family program is a program that among other features allows commingling of loans from different issuers in the same pool (Figures 2 and 3 provide a summary of the GNMA II program). GNMA II prepayments are usually similar or slightly slower than GNMA I prepayments. One reason why GNMA II prepayments may be slower than GNMA I prepayments is the presence of rate buydown loans which tend to prepay slower than non-buydown mortgages, especially in the first several years. Another reason may be that the GNMA II program attracts smaller issuers who are less efficient in buying out delinquent premium loans.

The interaction of the above factors often makes it difficult to disentangle and isolate a change in prepayments due to a single factor. For example, Figure 18 shows the seasoning ramp for at-the-money GNMA and FNMA pools originated since 2004, grouped by vintage. Generally speaking, the seasoning ramp for FNMA and GNMA pools appears to be extending for more recent vintages because of lower housing turnover and a decline in cashout refinance rates. However, speeds for 2005 and later GNMA vintages clearly slowed down much more than for FNMA vintages especially for WALA 7 to 15 months. While slower HPA rates clearly should have affected GNMA more than FNMA, another factor that contributed to slower GNMA speeds for 2005 and later vintages was the introduction of new rules for refunding the FHA upfront insurance premium at the end of 2004. The new rules decreased refunds for FHA-to-FHA refinancings while eliminating refunds for other prepayment types, thereby reducing the incentive for mortgagors to prepay, especially for more recent borrowers. The change in the rules right before the housing market started cooling off makes it more difficult to isolate the effect of the housing market slowdown on GNMA collateral. To make things even more complicated, starting in 2004, as per our discussion in Section II, many potential GNMA borrowers migrated into the subprime non-agency sector which may have contributed to the change in the GNMA prepayment profile by changing the borrower population for GNMA pools.

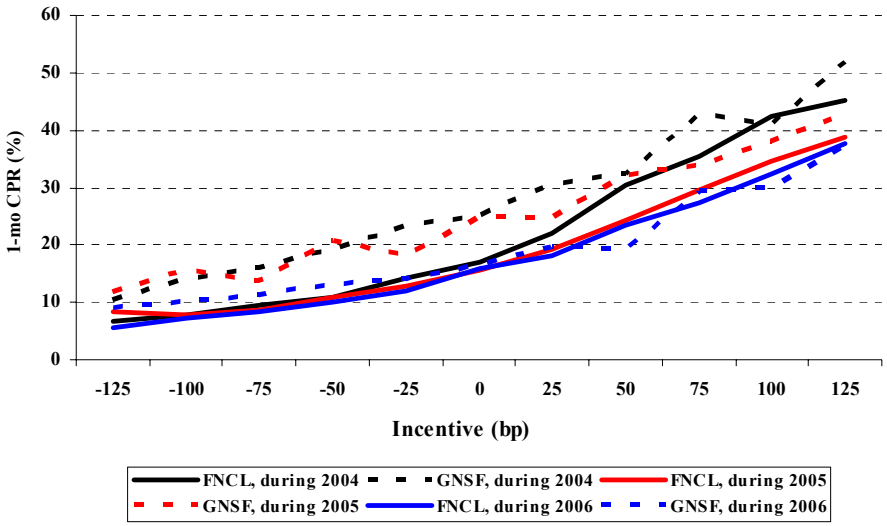
Figure 18: The Seasoning Ramp for FNMA and GNMA At-the-Money Pools*



*Rate incentive between -25 to +25bps
Source: Ginnie Mae, Fannie Mae, Banc of America Securities

The dramatic slowdown for 2005 and later GNMA vintages is also evident in Figure 19 which shows the prepayment S-curves for GNMA and FNMA pools seasoned 12 to 24 months, for prepayments observed in 2004, 2005 and 2006. It is clear that both FNMA and GNMA prepayments have progressively slowed down across all refinancing incentive levels. GNMAs, however, had a very pronounced drop in speeds for 2006 observations which correspond to mortgages originated at the end of 2004/early 2005. In addition to the factors that we have identified above as contributing to the slowdown for 2005 and later GNMA vintages, the dramatic slowdown of GNMA prepayments for the 2006 period was probably a result of the collapse in the subprime market that started to unfold in the second half of 2006, thus restricting the number of FHA borrowers refinancing into subprime. As has probably become apparent at this point, GNMA prepayment characteristics are generally much more affected by changes in the economic, regulatory and financial market environments than FNMA. This leads to GNMA prepayments being much less predictable than FNMA prepayments.

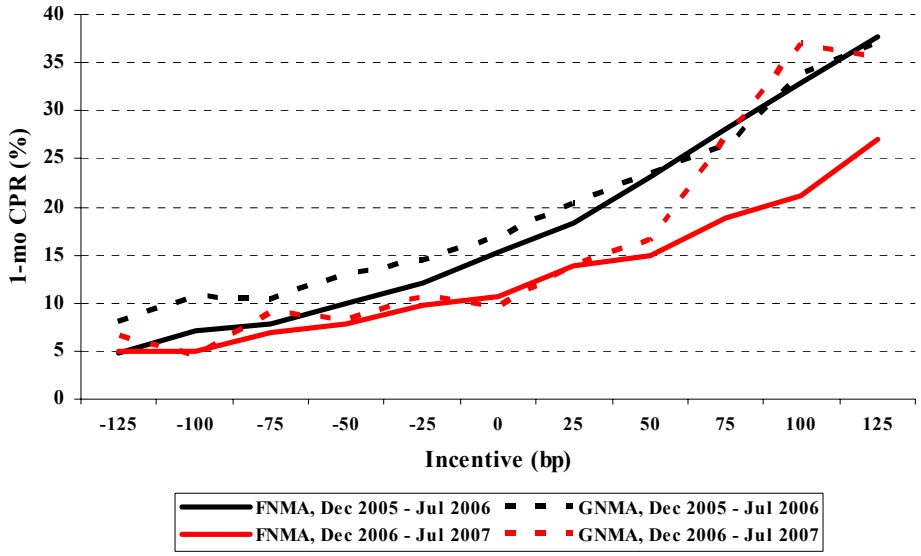
Figure 19: Fannie Mae and Ginnie Mae Prepayment S-Curves for 2004, 2005, and 2006*



*Pools with WALAs between 12 to 24 months
Source: Ginnie Mae, Fannie Mae, Banc of America Securities

Finally, in Figure 20, we focus on recent trends in GNMA and FNMA prepayments by plotting the dependence of prepayments on refinancing incentive for pools seasoned 12 to 24 months, for prepayments observed in December 2005 – July 2006 (Period 1) and in December 2006 – July 2007 (Period 2). Consistent with what we have seen so far, out-of-the-money and at-the-money prepayment speeds have been slowing down both for FNMAs and GNMAs as a result of the slowing housing market, with GNMA speeds declining more than FNMA. Note that in Period 2, GNMA speeds are very close to FNMA speeds for incentives up to around 50bps, in contrast to what has been observed for many preceding years. The sharp pick up in GNMA speeds for the Period 2 at incentives 75 to 125bps was due to the servicer buyouts of premium delinquent loans following the recent sharp increase in delinquency rates in late 2006 – 2007.

Figure 20: Fannie Mae and Ginnie Mae Prepayment S-Curves in December 2005 – July 2006 and December 2006 – July 2007*



*Pools with WALAs between 12 to 24 months
Source: Ginnie Mae, Fannie Mae, Banc of America Securities

V. THE GINNIE MAE BUYOUT OPTION

Servicers of GNMA I and II pools are given a valuable option by GNMA. Under certain restrictions, they have the ability to "call" (or buyout) delinquent loans at par from GNMA pools. We will shortly discuss the technicalities associated with the exercise of the buyout option but the key takeaway for investors is that since a buyout is equivalent to a prepayment, understanding this option and accounting for its value when pricing GNMA pools is potentially of considerable importance. We say "potentially" because obviously the value of the option depends upon how frequently it is exercised. The buyout option is important enough that we devote this section to providing a detailed sense of the mechanics of the buyout option, discussing the economic rationale behind option exercise, and illustrating the contribution of the buyout option to prepayment speeds on GNMA pools. We show that the exercise of the buyout option contributes meaningfully to GNMA prepayment speeds (as much as ~10%-15% CPR on high premiums) and that, contrary to some published estimates, it is economically viable to exercise the option at or slightly below par. Appendices A and B provide a high-level overview of the FHA and VA mortgage insurance/guarantee programs that play a key role in influencing servicer exercise of the buyout option.

The Rules Governing GNMA Buyouts: Then and Now

Prior to 2003, the rules governing buyouts of delinquent loans were much less stringent than they are right now. In this "pre-modern" era, servicers could buy a delinquent loan out of a Ginnie Mae pool subject to the following constraints:

(A) The borrower had missed 3 consecutive monthly payments; or

(B) The borrower had failed to make up a missed payment for four consecutive months.

This practice was known as "early buyout" and attracted the attention of the mortgage market as far back as 1998 when speeds on GNMA 9.5s and higher coupons experienced large increases because of the exercise of the buyout option by Midfirst Bank, an Oklahoma-based originator and servicer. The use of early buyouts became common practice for Ginnie Mae servicers and several of these servicers generated significant income through the exercise of these options over 2002-2003 by buying delinquent premium loans at par, curing them, and then reselling them at an above-par price to a third-party or into an MBS. A steady decrease in interest rates over this period added further momentum to this practice. The exercise of the buyout option thus contributed to windfall gains for mortgage originators (at the expense of bondholders) and led to Ginnie Mae tightening its buyout standards in 2003. The new standards stipulated that for pools issued in 2003 or beyond, only loans in category (A) above could be bought out. Clearly, (A) is a far more stringent requirement than (B), since it is much less challenging to cure a loan with 1 missed payment and that is cash-flowing again, than to cure a loan in which the borrower has missed three consecutive payments. In fact, anecdotal information collected from originators around this period suggests that approximately 75% of all bought out loans fell into category (B).

The discussion above more or less summarizes the restrictions applying to buyouts, but for convenience we will summarize the rules in detail. A servicer can buy a loan out of a Ginnie I or II pool at any point in time without explicit authorization from Ginnie Mae provided:[11]

- **For GNMA pools issued on or before 12/1/2002**. The borrower does not make up a missed monthly payment for four consecutive months (a "rolling" delinquency) or is delinquent for three consecutive months.
    - For example, assume that the borrower misses a payment on March 1 but makes timely payments on April 1, May 1 and June 1. The issuer may purchase the loan out of the pool on or after July 1.
- **For GNMA pools issued on or after 1/1/2003.** The borrower misses three consecutive monthly payments.
    - For example, assume the borrower misses their payments on March 1, April 1 and May 1. The issuer may purchase the loan out of the pool on or after June 1.

If a buyout loan starts reperforming, the servicer has several options. It may choose to keep the loan in portfolio, place it in a new GNMA pool[12], sell it into an agency pool (a Fannie Mae FNGO pool for example), sell it into a private-label trust, or sell it to a third-party.

There is another set of rules that also contributes to buyouts. GNMA issuers are required to maintain certain delinquency ratios on pools. There are three delinquency metrics that are monitored by GNMA:[13]

- **DQ3+ Delinquency Ratio:** This is the fraction of loans in the issuer's GNMA portfolio that are either in foreclosure or are 90+ days delinquent. This ratio needs to be less than or equal to 5%.
- **DQ2+ Delinquency Ratio:** This is the fraction of loans in the issuer's GNMA portfolio that are either in foreclosure or are 60+ days delinquent. This ratio needs to be less than or equal to 7.5%.
- **DQP Delinquency Ratio:** The accumulated amount of delinquent P&I payments divided by total monthly fixed installment control due to the issuer. This ratio needs to be less than or equal to 60%.

As a result of having these restrictions, we might see a situation in which an issuer exercises the buyout option just to maintain their delinquency ratios at acceptable levels. Note that this could potentially lead to "non-economic" exercise of the buyout option (i.e., a buyout of a delinquent discount loan at par).

[11] The buyout amount is equal to the outstanding principal balance less any principal payments advanced.
[12] A repurchased loan may only be placed in a new Ginnie Mae pool once, even if the loan is sold to a different issuer.
[13] The threshold levels for the delinquency indicators are presented for issuers with more than 1000 loans. Issuers with fewer loans have weaker requirements.

The Economic Rationale for Buyouts

Apart from keeping their delinquency ratios under control, there are compelling economic reasons for the servicer to exercise the buyout option under certain conditions. The conditions arise from some special features associated with FHA's insurance program and the existence of the buyout option in GNMA pools.[14] FHA loans play such a significant role in determining buyout behavior because they are more likely to be delinquent than VA loans and also because FHA loans constitute the majority of loans in GNMA pools. This is particularly true in high premiums where FHA loans can make up 80% of the pool or more.

The appendices go through some of the details of the FHA and VA mortgage insurance programs but for our purpose the important thing to note is that FHA insurance on single-family loans covers three broad areas:

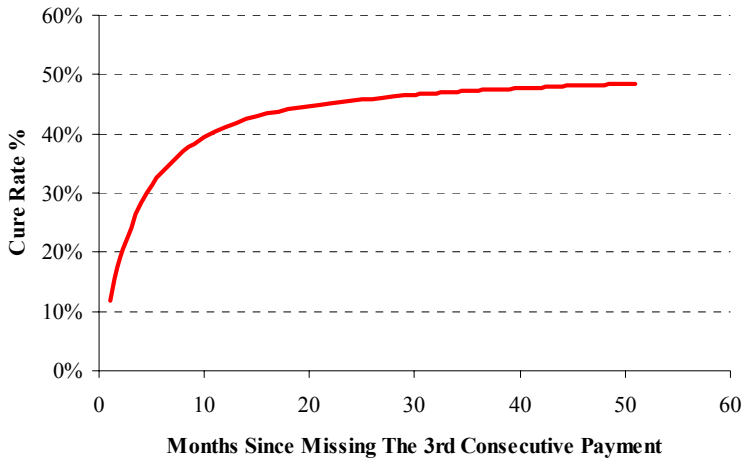
- **Principal.** 100% of all unpaid principal. This principal amount can be adjusted upward (servicer payments for taxes, insurance premiums paid by the servicer for fire and extended coverage etc.) or downward (any mortgage payments recovered by the servicer after default).
- **Interest.** FHA pays for all mortgage interest accrued and unpaid on the balance of the loan 60 days after the borrower's first missed (and uncorrected) payment all the way through the insurance claim date. These interest payments are reimbursed at the applicable HUD debenture rate. Formerly, the debenture rate was the rate in effect at the date of the insurance commitment or the endorsement for insurance, whichever was higher. As of January 23rd 2004, the debenture rate is set to the monthly average yield of the 10-year CMT for the month in which the default occurred.
- **Expenses.** 2/3rds of the eligible foreclosure expenses for a loan. The eligible foreclosure expenses include attorney's fees and maintenance costs. Non-reimbursable expenses include the operational costs associated with contacting the borrower about their missed payments along with the associated follow-up actions.

Now, let's consider the case of an FHA loan that has missed three consecutive monthly payments. First, notice that regardless of whether the servicer buys the loan out of the pool or not, they potentially face the increased expenses associated with servicing this loan as it moves through the different stages of the delinquency and foreclosure process. As the capsule description of the FHA insurance program above suggests, some of these expenses are non-reimbursable and thus the servicer will typically incur a loss on a defaulted loan. Consequently, given that the servicer is on the hook for this loss whether they buy the loan out or not, the key question is what incremental benefit does the servicer potentially derive by buying out the loan?

For one thing, if the servicer buys out a delinquent premium loan at par and cures it, then they could potentially record a significant gain-on-sale by selling the reperforming loan into another securitization at an above-par price. Clearly, they do not have this flexibility if the loan is not bought out. As Figure 21 shows, even subprime borrowers who had missed three consecutive payments have relatively high cure rates over an extended period of time.

[14] The appendix goes through some of the details of the FHA and VA mortgage insurance programs.

Figure 21: Cumulative Cure Rate for Subprime Loans Missing 3 Consecutive Payments



Source: Banc of America Securities

However, even in the unlikely situation that every loan that missed 3 consecutive payments was destined to default, it would still make sense for a servicer to buyout loans under certain conditions because of the nature of FHA's insurance program. Figure 22 walks us through some of the economics of this decision. Basically, the figure implies that if the servicer funding rate F is below the MBS coupon rate C, the servicer would consider buying the loan out of the pool (assuming that the loan is priced at par or above). Note that just having C greater than F is not a sufficient reason for buyout since the servicer is taking on some duration risk (the delinquent mortgage is hedged with short-term funds). There is little to no convexity risk however since the delinquent loan is effectively non-prepayable.

Figure 22: To Buyout or not to Buyout

Keep in Pool

- Pay MBS coupon (C) to Investors (-)
- Pay funding cost on advanced coupon payments at rate F (-)
- Get reimbursed for coupon payments at FHA Debenture rate D (+)

Buyout

- No MBS coupon (C) to Pay
- Pay funding costs on unpaid principal balance of loan at rate F (-)
- Get reimbursed for funding costs at FHA Debenture (D) rate (+)

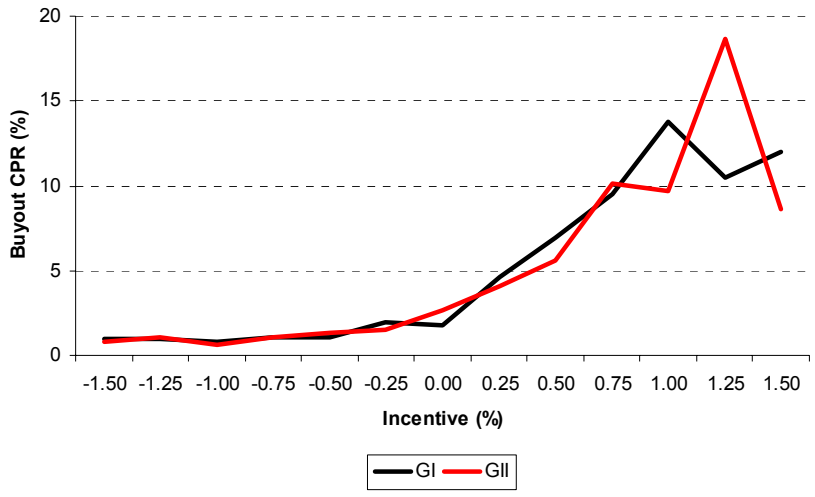
Source: Banc of America Securities

Even though it rarely makes sense for a servicer to buyout a delinquent discount loan at par, Figure 22 suggests that under certain conditions this may not be sub-optimal. In particular, the "negative carry" associated with situations in which C is greater than F may not be tolerable over a prolonged period of time.

The Impact of Buyouts on GNMA Prepayment Behavior

Our analysis thus far suggests that the servicer has incentive to exercise the buyout option on a 90-day delinquent loan whenever it is priced at par or above and that this incentive increases as a function of the coupon of the loan (higher coupon loans can be sold at higher prices and higher coupons have a greater spread to F). The empirical data on buyout rates are consistent with our analysis. For example, Figure 23 plots the relationship between buyout rates and incentive for GNMA I and II pools with loan ages between 12-24 months over the past year. The relationship resembles the distinctive S-shaped curve that characterizes the increase in prepayment as a function of incentive. "Out-of-the-money" buyout rates average around 1% CPR and increase to between 10%-15% CPR at sufficiently high levels of incentive. The pattern in buyout CPRs is consistent across both GNMA Is and IIs with GNMA I pools showing marginally greater rates (~0.5% CPR across incentives) of buyout activity. The other key point to note from the figure is that buyouts rise steeply as the pool incentive crosses 0 bps indicating that the **breakeven buyout price** is at or slightly below par.

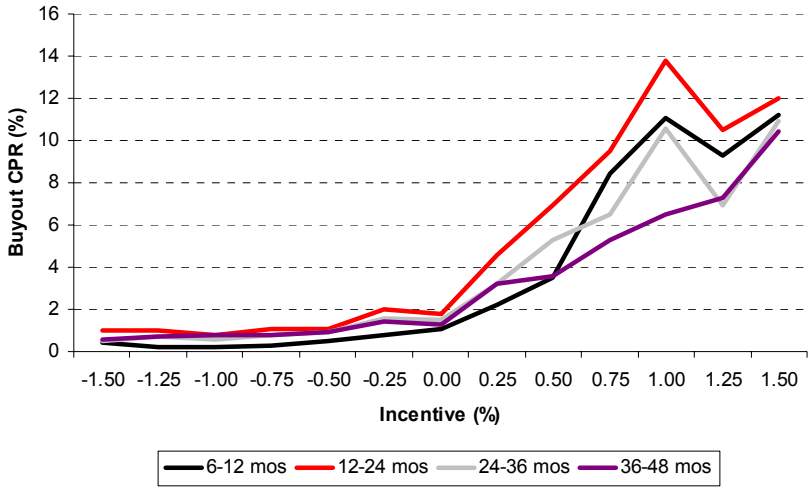
Figure 23: The GNMA Buyout S-Curve*



*For GNMA pools with a WALA between 12 to 24 months.
Source: Banc of America Securities

Buyouts also show a natural dependence on seasoning that tracks the pattern of default-related behavior on mortgage loans (see Figure 24). In general, default rates on residential loans gradually ramp up over the first 1-3 years, level off for a couple of years, and then decline as the home owners build up more equity through home prices increases and principal amortization.

Figure 24: The Dependence of Buyout Rates on Seasoning



Source: Banc of America Securities

VI. RELATIVE VALUE IN GINNIE MAE MBS

Case Study: A Brief History of GN/FN Swap Prices

GNMA passthroughs are usually quoted in terms of the price of GN/FN swaps. In this section, we take a look at the factors that typically drive the prices of these swaps. Figure 25 illustrates the most recent 10-year history of prices on the GN/FN 6s swap along with the dollar prices of GNMA 6s. There were three periods of sharp changes in the price of the swap in this history:

- GN/FN 6s swap traded as high as 13-14 ticks in early 1999 but declined to negative 25 ticks by January 2000. This swap then spiked up sharply to 1-00 by May 2000.
- In June-July 2002, GN/FN 6s traded at 0 ticks but this swap jumped up to as high as 1-00 in June-July 2003.
- GN/FN 6s jumped up from 0-22 to 1-20 over a few weeks time from October 2005 to January 2006.

Below, we take a detailed look at the some of the factors that caused these sharp movements in GNMA prices.

Price Movements from January 1999 to January 2000

GN/FN 6s traded at around 13-14 ticks in the beginning of 1999 but fell to negative 25 ticks by early 2000. This period marked a rarity in GN/FN 6s swap prices as it was one of the few occasions over the past 10 years that the swap traded in negative territory for a sustained period of time (almost a year). The obvious question that pops up is what made GNMA securities – backed by the full faith of the U.S. government – trade at such wide levels to FNMA securities? As is evident by looking at Figure 25, GN/FN 6s and GNMA 6s moved in tandem during this period with the swap trading downward as GNMA 6s got progressively more out-of-the-money. The reason for this price action was because GNMA 6s were consistently prepaying 1%-2% CPR slower than FNMA 6s, and as these securities moved out-of-the-money, the 1%-2% CPR differential in speed became more and more valuable. Around January 2000, GNMA and FNMA 6s were trading with an 89 handle and at these dollar prices the 1%-2% CPR difference in speeds can be worth up to a point. It is not surprising that this was also the time when GN/FN 6s swap was at its all-time low of negative 25.

After trading at negative 25 in the beginning of 2000, the GN/FN 6s swap appreciated considerably over the next 2-3 months to trade at around 20 ticks – even though prices on GNMA 6s remained close to $90. This sudden appreciation in the swap price took place as the budget surplus of the U.S. government reached multi-year highs and rumors of Treasury debt buybacks led to investors buying GNMAs as a substitute for Treasuries. This pushed up the GN/FN 6s swap to 1-00 by the middle of 2000.

Price Movements from Mid-2002 to Mid-2003

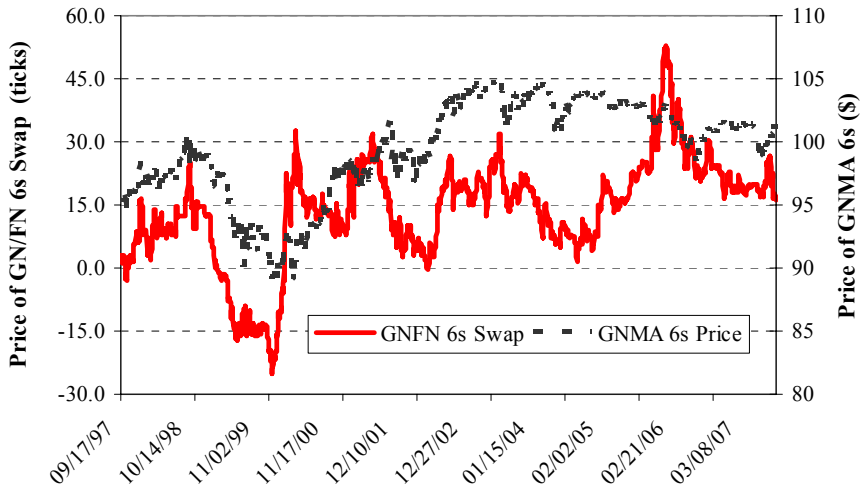
The second period of interest is the mid-2002 to mid-2003 time period when the GN/FN 6s swap gained almost 1 point. As mortgage rates rallied to multi-year lows by the middle of 2003, GNMA 6s and FNMA 6s became super premium securities (from discount securities in mid-2002). At the same time, historically low mortgage rates led to a massive wave of

refinancings which culminated in FNMA 6s prepaying at 50%-60% CPR. Speeds on GN 6s in the same period were around 10% CPR slower than FNMA 6s (at 40%-50% CPR). Because of the slower prepayment speeds of GNMA 6s, the GN/FN 6s swap appreciated to around 1-00 by June-July 2003.

Price Movements in Late 2005 and Early 2006

All GN/FN swap prices became highly volatile towards the end of 2005 as liquidity in the GNMA sector declined sharply. This drop in liquidity was primarily because of the very low issuance levels in GNMAs, which in turn resulted from the FHA's loss of market share to the conventional and subprime sectors (as discussed in Section III). Net issuance of GNMAs was strongly negative from 2002 to 2005 and the outstanding balance of GNMAs dropped by nearly $196bb over this period. These positive supply technicals led to the GN/FN 6s swap trading at 1-20 at the beginning of 2006. As the net issuance of GNMAs turned positive in 2006, the GN/FN 6s swap price also started moving downwards and reverted to around 15 ticks.

Figure 25: 10-year Price History of the GN/FN 6 Swap



Source: Banc of America Securities

Quantifying the Intrinsic Value of GNMA/FNMA Swaps

As the discussion in the previous section suggests, prices of GN/FN swaps depend on a number of factors including:

- The value the market places on the explicit government guarantee on GNMAs;
- Prepayment speed differences on the underlying collateral; and,
- Supply/demand technicals.

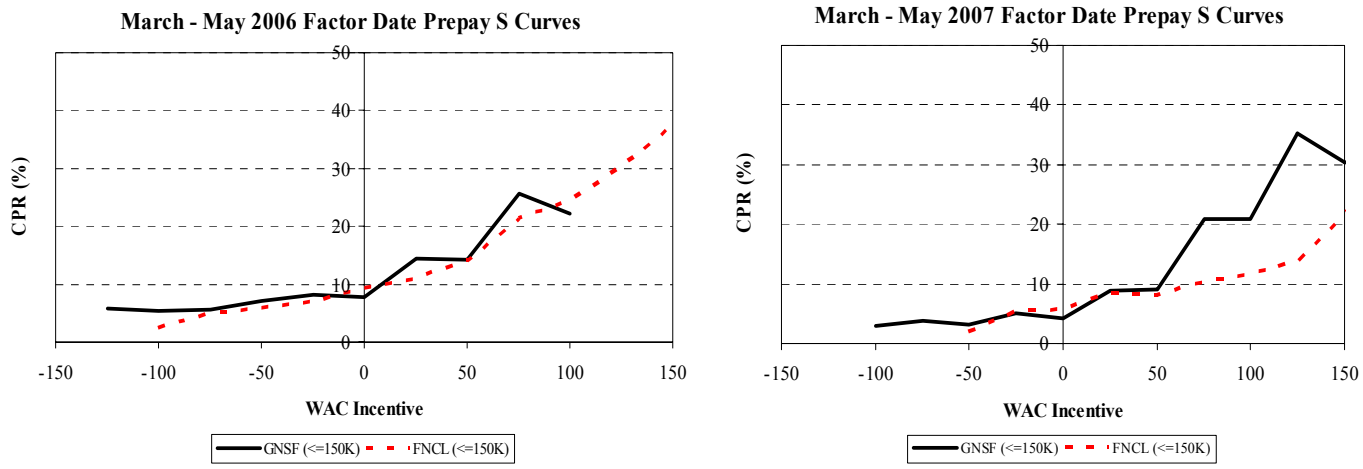
We walk through a typical analysis that is used to estimate the intrinsic value of GN/FN swaps. The analysis hinges upon the prepayment speed differences between the collateral being delivered for TBAs in the GNMA and FNMA markets.

Figure 26 compares prepayment S-curves (for pools with a WALA of 6-12 months) for 30-year GNMA and FNMA pools for March-May 2006 factor dates and for March-May 2007

factor dates. In this figure, we have only considered loans with loan sizes less than $150K to control for the dependence of prepayments on loan size. The FNMA and GNMA S-curves were on top of each other in early 2006 but by the middle of 2007, GNMAs that were more than 70 bps in-the-money were prepaying 8%-10% CPR faster than FNMAs after adjusting for loan size and age differences which is largely because of higher buyouts on premium GNMA pools.

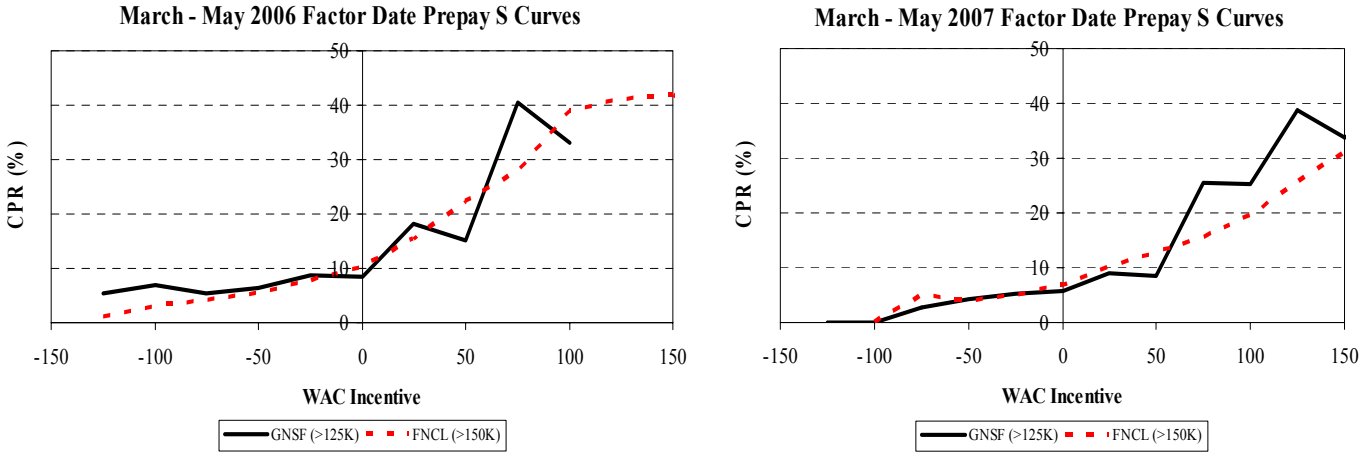
In practice, given that the TBA deliverables corresponding to FNMA 5s-6.5s will have loan sizes that are higher than $150K and the TBA deliverable for GNMA 5s-6.5s will have loan sizes that are higher than $125K, we plot the prepayment S-curve for GNMA pools with loan size greater than $125K versus the prepayment S-curve for FNMA pools with loan sizes greater than $150K in Figure 27. This essentially compares prepayment responsiveness of TBA deliverable collateral for GNMAs and FNMAs. GNMA pools that are more than 70 bps ITM are prepaying 5%-10% CPR faster than FNMAs in 2007 after this adjustment

Figure 26: Prepayment S-curves for GNMA and FNMA Pools with Loan Sizes Less Than $150K



Source: Banc of America Securities

Figure 27: Prepayment S-curves for GNMA Pools with Loan Size > $125K and FNMA Pools with Loan Size > $150K



Source: Banc of America Securities

Figure 28 provides a summary of how we can assess relative value in GN/FN swaps based on pricing from May 2007. The "Model" column in this table indicates where GN I/FN and GN II/FN swaps should trade on an equal OAS basis after considering differences in the characteristics of TBA deliverable collateral and faster prepayment speeds of GNMA premiums due to servicer buyout activity. The numbers under "Including the Value of Govt Guarantee" account for the 5-7 bps yield premium historically offered by FNMA MBS over GNMA MBS to compensate for the explicit government guarantee on GNMAs. Based on the valuations presented in Figure 28, the GN I/FN and GN II/FN 5.5s and 6s swaps were offering the explicit government guarantee embedded in GNMAs for free.

Figure 28: Assessing Relative Value in GN I/FN and GN II/FN Swaps

	Excluding the Value of Govt Guarantee				Including the Value of Govt Guarantee			
	GN I/ FN Swap		GN II/ FN Swap		GN I/ FN Swap		GN II/ FN Swap	
30-yr TBA	Model	Actual	Model	Actual	Model	Actual	Model	Actual
5.0s	9.0	42.0	6.5	14.0	18.4	42.0	15.9	14.0
5.5s	10.5	21.5	8.5	8.5	18.5	21.5	16.5	8.5
6.0s	14.0	14.5	11.0	6.5	20.4	14.5	17.4	6.5
6.5s	2.9	13.0	3.9	9.0	7.7	13.0	8.7	9.0

All numbers are in ticks; Actual prices are as of 10/09/2007.

Source: Banc of America Securities

Appendix A. An Overview of the FHA Insurance Programs

The FHA Insurance Program at the Borrower Level

The FHA insurance premium paid by borrowers is structured in two parts: (1) a lump sum at closing (the **up-front mortgage insurance premium** or **UFMIP**) and (2) a monthly fee that can extend over several years (the **annual premium**). Both sums are charged as a percentage of the initial loan amount. Since the UFMIP is earned over the life of the loan, the borrower receives a refund if the loan is paid off early. The amount of the UFMIP, the annual premium and the refund schedule have all been subject to several revisions over the years. The current cost of the mortgage insurance (as of November 2007) for all borrowers who have taken out an FHA loan after December 8th, 2004 is as follows:

- **UFMIP.** The up-front premium is 1.50% of the loan amount for all loans (homebuyers and refinancers).
- **Annual Premium.** There is a 50bp annual insurance fee that is cancelled after the homeowner has an *amortized* LTV of 78% or less, provided that the mortgagor has paid the annual mortgage insurance premiums for at least 5 years.[15]
- **Refund Schedule.** Currently, HUD will only provide a refund for FHA-to-FHA refinances. The refund schedule is 3 years.

The FHA Insurance Program at the Servicer Level

We now discuss the insurance coverage that FHA provides in return for the borrower fees they receive through the payment of UFMIP and the annual premium.

The FHA Debenture Rate

An FHA debenture is a bond with a 20-year term issued by the FHA that pays interest semi-annually. FHA-issued debentures bear interest at rates set by the U.S. Treasury. Previously, the debenture rate was set by FHA twice a year on January 1 and July 1. The debenture rate that was applicable to a FHA loan was the debenture rate in effect as of the date of the insurance commitment, or the endorsement for insurance, whichever was higher. However, starting January 23rd, 2004, the debenture rate for a particular loan is set to the monthly average yield of the 10-year CMT for the month in which the default occurred.

The FHA Single-Family Mortgage Insurance Program

HUD will typically pay insurance claims in cash upon completion of the foreclosure process and the property being conveyed to HUD.[16] HUD frowns upon servicers initiating foreclosure proceedings early in the delinquency stage and recommends following a loss mitigation program such as forbearance[17] or loan modification. FHA insurance on single-family loans covers three broad areas:

- **Principal.** 100% of all unpaid principal. This principal amount can be adjusted

[15] Note that since the LTV ratio is not based on property value appreciation, it will typically take about 10-12 years for most loans to reach this target level since the average starting LTV on an FHA loan is 95% or more.
[16] HUD can also pay the claim amount in debentures but this is apparently fairly rare nowadays.
[17] In a forbearance plan, the borrower may be able to reduce or suspend their monthly payments for a specified period of time and then make these payments up at or before the maturity date of the mortgage.

upward (servicer payments for taxes, insurance premiums paid by the servicer for fire and extended coverage etc.) or downward (any mortgage payments recovered by the servicer after default).

- **Interest.** FHA pays for all mortgage interest accrued and unpaid on the balance of the loan 30 days after the borrower's first missed (and uncorrected) payment all the way through the insurance claim date. These interest payments are reimbursed at the applicable HUD debenture rate. Formerly, this was the rate in effect at the date of the insurance commitment or the endorsement for insurance, whichever was higher. As of January 23rd 2004, the debenture rate is set to the monthly average yield of the 10-year CMT for the month in which the default occurred.
- **Expenses.** 2/3rds of the eligible foreclosure expenses for a loan. Eligible foreclosure expenses include attorney's fees and maintenance costs. Non-reimbursable expenses include the operational costs associated with contacting the borrower about their missed payments along with the associated follow-up actions.

It is instructive to look at the complement of FHA's insurance program – i.e., what FHA's insurance program does not cover. Based on the above discussion, FHA insurance does not cover 1/3rd of reimbursable foreclosure expenses, all non-reimbursable expenses, 2 mortgage coupon payments, and the interest rate differential (on a principal amount equal to the unpaid balance of the loan), if any, between the mortgage coupon rate and the debenture rate. Thus, the loss severity on FHA loans will be a function of these components. In general, servicers do lose money on defaulted FHA loans. While no comprehensive statistics are available on what these amounts are, a Price Waterhouse survey conducted in 2003 suggested that "best practice" servicers lost less than $1800 per defaulted FHA loan (approximately ~1.8% of the loan balance, based on an average GNMA loan balance of $100,000 in 2003), although estimates from earlier studies put the average amount around $2600.

Appendix B. An Overview of the VA Guarantee Program

Overview of VA's Home Loan Program

The idea behind VA's Home Loan Guaranty program is to help people who served or are serving in the Armed Forces finance their homes. In general, participants who are eligible for a VA home loan currently fall into one of the following groups: (1) veterans, (2) active duty military personnel, (3) reservists, and (4) surviving spouses.[18] The program provides assistance to qualified applicants by guaranteeing a portion of the principal balance on a loan made by an independent originator (we will get into the details of the guarantee program shortly). The mortgage loan can be used to finance the usual spectrum of housing-related activities: purchase a home, build a home, refinance an existing home loan, or improve a home by installing energy conserving devices.

The main reason why a veteran would take out a VA loan is because it's a no down payment loan (LTVs of up to 100% are allowed) with no PMI-required and no prepayment penalty in conjunction with relatively relaxed underwriting standards.[19] Contrast this to even an FHA loan where you typically need 2%-3% down. Borrowers do pay a one-time **funding fee** that is equivalent to an upfront insurance premium.[20] The funding fee ranges from 0.5% to 3.30% and depends upon a number of factors which are summarized in Figure 29. Most VA borrowers will roll the funding fee into the loan balance.

Figure 29: Funding Fee Structure for VA

Percent of Base Loan Amount		
Type of Loan	Veteran/ Active Duty	Reservist
Loans with No Down Payment or with <= 5% Down Payment		
First time Users		
10/1/2004 - 9/30/2011	2.15%	2.40%
Multiple Users		
1/1/2004 - 9/30/2011	3.30%	3.30%
Loans with Down Payment - Loans closed before 10/1/2011		
>5% and <10%	1.50%	1.75%
>= 10%	1.25%	1.50%
Other Loans		
Interest Rate Reduction (IRRRL)	0.50%	0.50%
Cash-out refinancing	2.20%	2.40%
Assumptions	0.50%	0.50%

Source: VA

VA performs a variety of administrative functions throughout the lifetime of the loan. At the beginning of the origination process, VA determines the eligibility of veterans. VA also

[18] For loans originated between 1999 and 2003, the mix of participants in the groups as follows: 82% of the participants were veterans, followed by active duty personnel (14.6%), reservists/national guardsmen (3.2%) and surviving spouses (0.2%). Source: *Evaluation of VA's Home Loan Guaranty Program* (July 2004).

[19] Using a guideline of a 5% down payment and a DTI of 36% or less, a study of VA's underwriting guidelines revealed that between 75%-80% of all VA loan holders would not qualify for a conventional loan. Source: *Evaluation of VA's Home Loan Guaranty Program* (July 2004).

[20] Exemptions from this funding fee include veterans receiving VA compensation for service-connected disabilities; veterans who, but for the receipt of retirement pay, would be entitled to receive compensation for service-connected disabilities; surviving spouses of veterans who died in service or from a service-connected disability.

collects funding fees, monitors and oversees lenders and appraisers and services loans that are in default.[21]

Details of VA's Guarantee Program

Unlike the FHA program, the VA guarantee does not cover the entire principal amount and is a function of the principal balance (see Figure 30). Apart from some fraction of the principal amount, the guarantee amount also covers accrued and unpaid interest and certain foreclosure costs. The VA is similar to the FHA in the sense that lenders are encouraged to not enter the foreclosure process too quickly and to initially pursue loss mitigation strategies. In general, the VA servicer can only foreclose after the default has continued for 3 months.

Figure 30: The VA Guarantee Program

Principal Balance	Guarantee Amount
<= $45,000	50% of the principal amount
>$45,000 & <= $144,000	40% of the principal amount, subject to a minimum of $22,500 and a maximum of $36,000
>$144,000	25% of the principal balance, upto a maximum of $60,000

Source: Banc of America Securities

There is one important nuance to the VA guarantee program. Before the foreclosure sale, the servicer has to obtain an appraisal of the property. If the home value is less than the *unguaranteed* portion of the total indebtedness, VA will not accept conveyance of the property. In this situation (called a **no-bid**), VA pays the guaranteed benefits to the servicer and the servicer takes title to and is responsible for liquidating the property. The logic behind VA's policy in this case is that if VA were to take possession of a property with a value that is less than the total unguaranteed amount, then they would incur a loss upon selling that would effectively increase the amount that they paid out in insurance benefits. Given this scenario, servicers do have the option of buying down the loan amount so that VA experiences no further loss on sale of the property. This makes it more palatable for VA to purchase the property at the foreclosure sale. In general, servicer losses on VA defaults typically average around 40% of those experienced on FHA loans.

[21] If a VA loan goes into foreclosure, VA will often purchase the property collateralizing the loan and then market it to the public. It also provides financing for approximately 75% of these properties. The VA loan financing a previously foreclosed property is called a **vendee** loan. These loans are accumulated by VA until they reach a critical mass and then securitized through VA's Vendee Mortgage Trust securitization program.

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