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GNMA Mortgage-Backed Securities: A Treasury Alternative Offering Quality and Yield

High-quality alternative to Treasuries

In today's world of historically low interest rates, achieving a positive inflation-adjusted return is challenging. Specifically, investors would need to find at least a 2% nominal return just to exceed the Federal Reserve's inflation target. Among U.S. Treasuries, a 2% yield is currently available only on bonds having maturities longer than 10 years. However, Treasuries of such long maturity can have substantial interest-rate risk. While venturing into the credit market can help investors meet their return needs, they risk losing some of their principal.

Mortgage-backed securities (MBS) guaranteed by the Government National Mortgage Association—GNMAs—can offer a compelling alternative.¹ The most basic and common MBS is a pass-through, which "passes through" to investors the monthly principal and interest payments from a pool of U.S. residential mortgage loans.²

MBS Types

GNMAs, in particular, are backed by pools of first-lien mortgage loans insured or guaranteed by the Federal Housing Administration (FHA), the Department of Veterans Affairs (VA), or the Rural Housing Service (RHS).³ The borrowers associated with these loans are typically first-time homebuyers, have a low to medium income profile, and can afford only a small down payment—5% or less.

GNMAs are the only MBS for which the government guarantees full and timely payment of principal and interest.⁴ This guarantee gives GNMAs the same credit quality as U.S. Treasuries. Fannie Mae (FNMA) and Freddie Mac (FHLMC) are two government-sponsored enterprises (GSEs) that issue MBS, but these MBS do not have an explicit government guarantee, only a strongly implicit one.⁵

Collectively, the MBS backed by GNMA, FNMA, and FHLMC are known as Agency MBS. The Agency MBS market has more than \$5 trillion outstanding, second only to the U.S. Treasury market in size, depth, and liquidity.

Private-label residential MBS (RMBS) are completely distinct from Agency MBS. While the latter get their credit support from the government guarantee (within the limitations stated above for FNMA and FHLMC), the former get their credit support primarily through senior/subordinate bond structures. The private-label RMBS sector is the part of the MBS market that suffered the most from the collapse of the housing bubble, and since the financial crisis of 2008, there has been virtually no new private-label issuance. At this point, most of the legacy securities originated in the years leading up to the crisis have been downgraded to junk status.

Government guarantee does not mean risk free

Like virtually all bonds, GNMAs have interest-rate risk—as interest rates rise, GNMA prices tend to fall, and as interest rates fall, GNMA prices tend to rise. Exhibit 1 (see page 2), illustrates the price volatility of a representative 4% GNMA pass-through security backed by 30-year fixed-rate loans. The price



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KEY TAKEAWAYS

- GNMA mortgage-backed securities (MBS) are backed by the full faith and credit of the United States government, and thus offer a highquality bond alternative to U.S. Treasuries.
- GNMA MBS offer incremental yield over U.S. Treasuries as compensation mainly for mortgage prepayment risk.
 Higher yield does not necessarily translate into higher return, but over the period from 1992 to 2012, GNMAs outperformed comparable Treasuries by about 0.35% per year.
- Like virtually all bonds, GNMAs have interest-rate risk—as interest rates rise, GNMA prices tend to fall, and as interest rates fall, GNMA prices tend to rise.
- Given the size and complexity of the GNMA MBS market, security selection supported by careful research has frequently identified opportunities to outperform the GNMA benchmark.

EXHIBIT 1: GNMAs experience interest-rate risk and price volatility.



Source: Bloomberg, as of Feb. 12, 2013.

of this security varied within a \$14 range from February 2010 to February 2012.

Duration is a useful way to quantify a bond's interest-rate risk. Roughly, duration equals the percentage change in the value of a bond for a one percentage point change in interest rates. So, as duration increases, so does price volatility. For example, the duration of 5-year and 10-year Treasury notes, for which the principal payment at maturity is by far the most significant cash flow, is about 4.8 and nine years, respectively. By comparison, the duration of a newly issued, par-priced 30-year GNMA pass-through is about seven years. The Barclays GNMA Index typically has a duration between four and five years, and this duration has ranged between two and six years since 2003.

Higher yields than Treasuries help compensate for prepayment risk

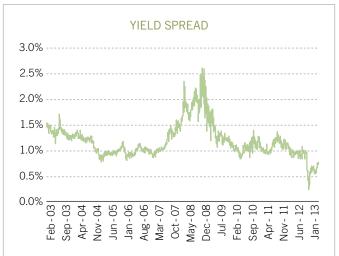
One of the appeals of GNMA MBS is that they typically yield 100 basis points or more versus comparable-duration Treasuries (see Exhibit 2, above right).

Prepayment sources

Importantly, the MBS yield advantage is not free. Rather, a significant portion of it is compensation for prepayment risk—most U.S. residential mortgages can be prepaid in part or whole at any time. In the context of GNMAs, there are three main sources of prepayments:

1. Sale of home. A home sale typically leads to the associated mortgage being paid off.⁶ Housing turnover is the dominant

EXHIBIT 2: Yield on GNMA MBS is typically higher than yield on comparable duration Treasuries.



Spread calculation: (Yield on 30-year par-priced GNMA MBS) – (0.3 X (Yield on 5-year Treasury) + 0.7 X (Yield on 10-year Treasury)) Source: Fidelity Investments, Bloomberg, as of Feb. 12, 2013.

source of prepayments in MBS in which the borrowers are paying a rate below prevailing mortgage rates.

- 2. Refinancing of loan. Borrowers refinance either to obtain a lower interest rate or to cash out some home equity, or for both reasons. Refinancing activity represents the most volatile component of prepayment speeds, and constitutes the dominant source of prepayments in MBS.
- 3. Buyout of seriously delinquent loans. Loan servicers of GNMA pools have the ability to buy seriously delinquent loans at par from GNMA pools.⁷

Prepayment risk

The option to prepay is valuable to borrowers.⁸ When rates fall, borrowers can refinance into a new mortgage that has a lower rate. On the other hand, when rates rise, borrowers can stay put in their existing mortgage, which then bears a below-market rate.

Since the prepayment option is valuable to borrowers, it must work to the detriment of MBS investors. Specifically, when rates fall, refinancing activity increases, and thus MBS holders get more prepaid principal and face reinvesting at lower yields. Similarly, when interest rates rise, refinancing activity slows, and MBS holders get less prepaid principal when they would most like to reinvest at higher yields.

Prepayment behavior

There is another, less broadly discussed aspect to prepayment risk. Specifically, unlike other callable bonds where the option is

exercised efficiently, the relationship between interest rates and prepayments is messy and inexact. Prepayment behavior depends on the collective decision making of thousands of individual borrowers evaluating the dollar value of the incentive to refinance or relocate given the prevailing lending environment. Thus, even if investors knew the future path of interest rates, the pace of prepayments would still be uncertain.

As a vivid illustration of how this uncertainty can affect investment returns, consider an MBS priced at \$110. Suppose that one day all the borrowers in the pool get a solicitation from their lender to refinance. If by chance they all take advantage of this opportunity, then investors will get their principal back at \$100 per security, for an immediate \$10 loss. In practice, prepayment surprises are rarely this dramatic, and surprises do not always lead to a loss. For example, in the aftermath of the financial crisis, lending standards tightened dramatically, and so prepayment speeds were slower than had been expected on securities priced above \$100, which worked to the benefit of investors.

In general, for securities priced above \$100, surprisingly fast speeds have hurt returns and surprisingly slow speeds have helped them; conversely, for securities priced below \$100, surprisingly slow speeds have hurt and surprisingly fast speeds have helped. This effect grows as the MBS price moves further from \$100 in either direction.

Historically, the incremental yield offered by GNMAs over Treasuries has more than compensated for the prepayment risk. For example, for the period from 1992 to 2012, the Barclays GNMA Index outperformed duration-matched Treasuries by an average of 0.35% per year.⁹

There are many opportunities for active management

In spite of the GNMA MBS market's size and depth, it is not nearly as efficient as the Treasury market. Skilled portfolio managers, supported by diligent research, trading, and risk controls, have frequently outperformed the Barclays GNMA benchmark.

These opportunities arise for several reasons. First, the market is diverse, comprising more than 200,000 securities, each having its own characteristics. Second, as just discussed, prepayment behavior is challenging to model and predict. Third, there are large institutional investors who do not devote the necessary resources to careful security selection; their inattention to detail leaves greater opportunity for other investors. Finally, the market trades over the counter, making continual market surveillance for price discovery and constant monitoring of supply and demand indicators critical. (See sidebar at right for several of the most important characteristics to consider in security selection.)

Valuing GNMA MBS

During the past 25 years, some market participants have developed extremely sophisticated MBS valuation models. These

Important characteristics to consider in MBS security selection

Characteristics	Considerations
MBS Coupon	Pass-through coupons are typically fixed-rate
Borrowers' mortgage rate	Interest rate is typically fixed for 30 years
Program	Prepayment speeds vary by program (e.g., VA loans tend to prepay the fastest; RHS loans tend to prepay the slowest)
Seasoning	Tenure in home can lessen moving or refinancing hassles
Origination date	Eligibility for streamlined refinance programs often has restriction on origination date
Maturity	As loans get closer to maturity, dollar savings from refinancing declines for fixed-rate issues
Loan balance	The higher the loan balance, the greater the incentive to refinance
Mortgage insurance premium	Extra costs (in addition to the mort- gage interest payments) that can influence refinancing decision
Loan to value (LTV) ratio	As LTV declines, home financing options can increase for borrower
Credit score	As a borrower's credit score increases, he or she generally has more financing options
Delinquency status	Delinquent loans are more likely to be bought out of a pool by servicer
Geographic distribution	Certain geographic locations have lower propensity to refinance
Servicer	Servicer efficiency in soliciting refinancing activity and buying out delinquent loans can vary

Source: Fidelity Investments.

models jointly consider all the attributes necessary to calculate the spread to Treasuries (adjusted for the prepayment option, i.e., the option-adjusted spread), the option-adjusted duration, and so forth.

The basic valuation approach involves three key models: a prepayment model, an interest-rate model, and a home-price model. The prepayment model quantitatively characterizes the individual homeowner's decision process, taking into account the effects of interest rates and the robustness of the housing market on the dollar value of the incentive to refinance or relocate. Given a set of loan characteristics, a future path for interest rates, and home prices, the prepayment model projects future prepayments (and buyouts of delinquent loans).

The prepayment model

Exhibit 3 (right) illustrates a simple prepayment model that captures many of the essential ingredients of more sophisticated models (see *Fidelity's Agile Model: A Refreshingly Transparent Approach to MBS Valuation*, Oct. 2011). The horizontal axis in the plot quantifies the rate incentive to refinance. For example, if the mortgage rate on the loans associated with this model is 5% and the prevailing mortgage rate is 3.5%, then the borrowers have 150 basis points of rate incentive to refinance; as prevailing rates change, so will the incentive to refinance.

The vertical axis quantifies the prepayment speed. The red dots summarize data on historical prepayment speeds. Finally, the red line is fit to the historical data and represents the prepayment model. Note that when the rate incentive is low, so is the prepayment speed. As the rate incentive increases, so does the prepayment speed until it saturates at a high speed.

This model has four parameters: (1) the maximum speed at which the borrowers will prepay, (2) the elbow location, i.e., the incentive at which the borrowers will prepay at one-half the maximum speed, (3) the elbow width, i.e., the width of the transition from low speeds to high speeds, and (4) the prepayment speed associated with housing turnover and buyouts.

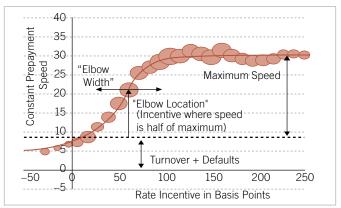
Such a simple prepayment model can actually be a pretty effective valuation tool, so long as the values of the four parameters are intelligently selected. For example, these parameters will depend on loan balance, i.e., loans with high balances will tend to be more responsive to refinancing opportunities than loans with lower balances. This behavior is well supported by historical prepayment data (see Exhibit 4, right). Sophisticated models will integrate the dependence on loan balance directly into the model with no need to manually intervene.

In practice, the prepayment response will vary over time in a manner that depends on the path of interest rates. For example, after a pool of loans has had several months (or years) of rate incentive to refinance, the responsive borrowers will have left the pool, leaving behind less responsive borrowers. That is, the pool will "burn out." This is illustrated in Exhibit 5 (right) in the context of loans originated in 2001. The red line shows the prepayment response in 2004. After the eager refinancers left the pool, the refinance response slowed down to match the blue curve in 2005.

Recent prepayment behavior

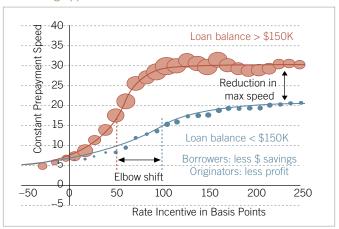
The biggest challenge in modeling prepayments is that behavior is not static, and so a model that merely fits historical prepayment data may provide a misleading picture of future behavior and current relative value. For example, in recent years, actual mortgage prepayment behavior has deviated substantially from what economic incentives would have predicted based on historical prepayment data. In spite of mortgage interest rates declining to all-time lows, refinancing activity has been

EXHIBIT 3: Prepayment models can show how interest rates and the strength of the housing market influence the incentive to refinance or relocate.



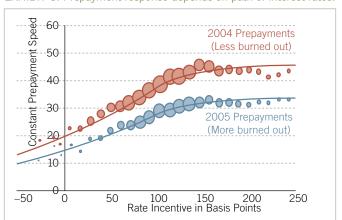
Source: Fidelity Investments. Freddie Mac and Fannie Mae 30-year loans' prepayment speeds¹⁰ from Nov. 1, 2010, to Feb. 1, 2013.

EXHIBIT 4: Loan balances sizes can indicate responsiveness to refinancing opportunities.



Source: Fidelity Investments. Freddie Mac and Fannie Mae 30-year loans' prepayment speeds¹⁰ from Nov. 1, 2010, to Feb. 1, 2013.

EXHIBIT 5: Prepayment response depends on path of interest rates.



Source: Fidelity Investments. 2001 originations of Freddie Mac and Fannie Mae 30-year loans. Endnote 10 has Constant Prepayment Speed definition.

EXHIBIT 6: Despite dramatically low rates, refinancing activity has been subdued.



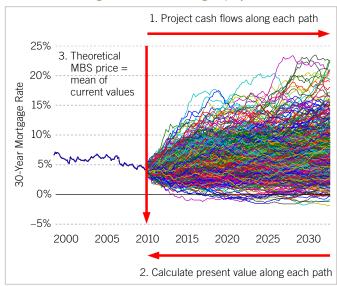
Source: Bloomberg, Mortgage Bankers Association, National Association of Realtors, data as of Feb. 8, 2013. The Mortgage Bankers Association Refinancing Index covers all mortgage applications to refinance an existing mortgage; it is a gauge of mortgage refinancing activity.

surprisingly subdued (see Exhibit 6, above). There are two main reasons for this: 1) U.S. home prices have declined, leaving many homeowners with insufficient home values to qualify for refinancing, and 2) credit lending standards have been tightened to the point where many homeowners do not meet the new refinancing requirements.

Housing policy also has the potential to change prepayment behavior. For example, over the past few years, the federal government has implemented programs to help homeowners who cannot refinance because they owe more than their homes are worth.

The details of the government's housing programs have had a significant impact on the prepayment speeds for specific types of MBS. However, government assistance has thus far had only limited success in triggering a large wave of refinancing. As a result, GNMA MBS have recently traded at a premium of approximately \$1.10 per dollar of face value even though a large percentage of U.S. homeowners have an immediate economic incentive to refinance. A new government housing policy could dramatically impact that situation. Though this is a risk, at the moment we do not expect such a policy change.

EXHIBIT 7: Valuing MBS without having to project interest rates.



Source: Fidelity Investments. Hypothetical example for illustrative purposes only.

Putting the pieces together

The interest-rate model is used to simulate hundreds—even thousands—of possible future interest-rate scenarios (see Exhibit 7, above right). Along each rate scenario, a prepayment model is used to project future cash flows. By setting the theoretical value of the MBS equal to the average of the present values of the cash flows across all the scenarios, this approach provides a way to value an MBS without taking a position on the future direction of interest rates. All that is needed is a view about future interest-rate volatility (to simulate future interest rates), and an opinion about what prepayments will occur for a given MBS and a given interest-rate scenario.

Investment implications

GNMAs offer a high-quality bond alternative to Treasuries. They have a higher yield than U.S. Treasuries as compensation mainly for prepayment risk. Given the size and complexity of the market, there are many opportunities for an active manager to outperform the GNMA benchmark. Specifically, security selection supported by careful research, trading, and risk controls can frequently identify investment opportunities. For most investors, a professionally managed and diversified portfolio can be the most effective way to get exposure to the MBS asset class.

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Investing involves risk, including risk of loss.

In general, the bond market is volatile, and fixed income securities carry interest rate risk. Fixed income securities also carry inflation risk and credit and default risks for both issuers and counterparties. Unlike individual bonds, most bond funds do not have a maturity date, so avoiding losses caused by price volatility by holding them until maturity is not possible.

It is not possible to invest directly in an index. All indexes are unmanaged.

Endnotes

- ¹ GNMA is a U.S. government corporation within the U.S. Department of Housing and Urban Development (HUD).
- ²A servicing fee and a guarantee fee are deducted from the monthly payments. Collateralized mortgage obligations (CMOs) are another class of MBS structures, designed to broaden the appeal of MBS. Using predefined rules, CMOs redistribute the cash flows generated by underlying collateral (either pass-throughs or other CMOs) into a collection of securities having a range of prepayment profiles and interest-rate sensitivities.
- ³ Overall, FHA loans represent about 75% of the outstanding balance of GNMAs, while VA and RHS loans represent 20% and 5%, respectively. There are also a very small number of loans insured by the Office of Public and Indian Housing (PIH).
- ⁴There are two layers of government protection in GNMAs. The insurance provided through the FHA, VA, RHS and PIH programs is at the loan level and covers—either partly or fully—the ultimate payment of principal on the loans. The insurance provided by GNMA is at the MBS level and guar-

antees that security holders will get full and timely payments of principal and interest at all times, including periods when the underlying borrowers are delinquent.

- ⁵ FNMA and FHLMC are government sponsored entities, publicly chartered and privately owned and operated.
- ⁶Loans in GNMA securities are assumable by the buyer of the home. In practice, however, assumability only makes sense when the following two conditions are met: (1) The rate on the loan is below prevailing rates, and (2) the new purchase price is roughly equal to the outstanding balance on the loan.
- ⁷While the loan stays in the pool, investors will continue to receive timely interest payments. Furthermore, if the borrower defaults while the loan is still in the pool, investors will get paid back the remaining principal. The point is that GNMA investors are protected from credit losses.
- ⁸ In addition, the option to buy out delinquent loans is valuable to servicers. Specifically, if the rate on the loan is above the current market rate and the delinquency can be cured, then the loan can be resold into a new security at a price above \$100.
- ⁹Source: Barclays GNMA Index. The index is the GNMA component of the Barclays U.S. Mortgage Backed Securities Index. It covers the mortgage backed pass-through securities of GNMA, the universe of individual fixed-rate GNMA pools. Securities have a weighted average maturity of at least one year, are fixed rate, and have at least \$250 million par amount outstanding.
- ¹⁰ Constant Prepayment Rate: measures prepayments as a percentage of the current outstanding loan balance. It is always expressed as a compound annual rate—a 10% CPR means that 10% of the pool's current loan balance pool is likely to prepay over the next year. Source: Hayre, L., Solomon Smith Barney "Guide to Mortgage-Backed Securities," 2001, Wiley.

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