

FIXED INCOME PRIMER:
**MORTGAGE-BACKED
SECURITIES**

A primer on mortgage-backed securities

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Overview

Mortgage-backed securities (MBS) are bonds backed by a pool of personal loans used to finance the purchase of homes or other real estate. As the loans are paid off, the mortgage payments are passed through to the bondholder, who then receives payments consisting of both principal and interest.

The process begins when a mortgage loan is extended by a financial institution (a savings and loan, a thrift, or a commercial bank) to finance the purchase of real estate. The lender can then pool the mortgages into groups with similar characteristics and sell them. Alternatively, the lender can sell the loans individually to be pooled by the purchaser. After the mortgages have been pooled into groups ranging from a few loans to thousands of loans, they are securitized and sold to investors. MBS issuance began in 1970.

Issuers of Mortgage-Backed Securities

Mortgage-backed securities usually fall into three groups: those that are issued and guaranteed by GNMA (the Government National Mortgage Association), those that are issued and guaranteed by FNMA (the Federal National Mortgage Association) or FHLMC (the Federal Home Loan Mortgage Corporation), and those that are issued by private entities. GNMA is an agency of the U.S. government, meaning that MBS issued by GNMA have the same credit quality as a U.S. Treasury security. FHLMC and FNMA are government-sponsored entities (GSEs). While MBS issued by these entities are not explicitly backed by the U.S. government, most market participants feel that there is an implicit government guarantee that insulates these securities from credit risk.

GNMA pools are primarily made up of loans guaranteed by the Federal Housing Administration (FHA) or the Department of Veterans Affairs (VA). In turn, GNMA guarantees the bondholders timely payment of interest and principal on the loans. FHLMC guarantees bondholders timely payment of interest and principal on fixed rate pools and timely payment of interest and eventual payment of principal

on adjustable rate pools. By contrast, timely payment of principal and interest is guaranteed for all securities issued by FNMA.

MBS backed by loans not qualifying for any of these three programs are issued by private entities. The loans may not qualify for a number of reasons, the most common of which is that the principal balance of the loan exceeds the maximum balance allowed by the government-related programs.

Types of Mortgage-Backed Securities

Mortgage-backed securities can be broadly separated into three categories: traditional pass-through securities, collateralized mortgage obligations (CMOs), and stripped mortgage-backed securities. The key differences among these types of mortgage-backed securities relate to the mechanics of the payment process.

- **Pass-Throughs** provide each investor in the pool with a pro rata distribution of the principal and interest payments made by the homeowners. Because most fixed rate mortgages are self-amortizing assets, the bondholder normally receives some portion of the bond's principal back each month.

In addition to regularly scheduled principal and interest payments, bondholders may receive additional cash flow from prepayments. Prepayments occur when homeowners choose to fully or partially retire their mortgage ahead of schedule. In these situations, the extra principal received from homeowners is passed through to bondholders. While the scheduled interest and principal payments are known in advance, the amount of prepaid principal is dependent on the behavior of homeowners, and therefore involves some level of uncertainty.

This inherent uncertainty regarding the timing and amount of prepayments is the primary risk to MBS investors. At the time of purchase, the investor typically makes assumptions about the security's future prepayment behavior. These assumptions may be based on a number of factors, including the current and expected future levels of interest rates, the types of homeowners and properties underlying the security, the average size of the

loans, and many other considerations. The investor uses these assumptions to arrive at baseline calculations of the yield and future cash flows for the security. However, should actual prepayment behavior diverge materially from expectations, the yield and cash flows achieved by the investor could differ significantly from the baseline calculation.

- **Collateralized Mortgage Obligations (CMOs)** allow for the creation of bonds with a wide range of risk and return characteristics. This is accomplished by carving the cash flows from a pass-through security into distinct tranches. The tranches are designed to meet the specific return goals and risk tolerances of a broad group of investors in a more efficient way than would be possible with traditional pass-through securities.

- **Sequentials**

The most basic CMOs are sequential pay structures. In these structures, all tranches receive their pro rata portion of the interest paid each month. However, all of the principal payments are initially distributed to one tranche, the “front-pay” tranche. Once the front-pay tranche has been completely paid down, principal is then distributed to the next sequential tranche. This process continues until all tranches have been retired. With a sequential structure, investors with a shorter time horizon or a duration target can purchase the front-pay tranche, while investors with longer targets can purchase the later tranches. Investors receive cash flows that are most appropriate for their profiles, as compared to cash flows from a pass-through security.

- **PACs**

As the CMO market has matured and become more sophisticated, an increasingly large number of structures and tranches have been created with more complex cash flow profiles. One such tranche is the Planned Amortization Class (PAC). PAC tranches are designed to absorb some of the prepayment volatility inherent in the underlying mortgages. The principal balance of a PAC is paid

down on a predetermined schedule. The schedule is kept as long as prepayments remain within a specified range (or “band”). With PAC tranches, the yield, duration, and cash flows are more likely to remain stable. Unlike the traditional sequential structure, payments can be made to one tranche at the same time as some or all of the other tranches.

- **TACs**

Targeted Amortization Class (TAC) tranches, like PAC tranches, provide more cash flow certainty than sequentials, and they have a fixed principal payment schedule. The schedule is determined using a single prepayment rate. Generally, TAC bonds provide protection against faster-than-expected prepayments, but they do not provide the same protection against slow prepayments that can be achieved with a PAC. To compensate investors for that additional cash flow risk, the yield on this type of tranche is frequently higher than those seen on PAC tranches.

- **Companion/Support Tranches**

Every CMO that has a PAC or TAC tranche will also have a Companion (or Support) tranche. The purpose of these tranches is to absorb the cash flow variability created by the PAC and TAC tranches, pushing the excess or shortfall of payments into the companion tranche. The average life of a Companion tranche may vary significantly, depending on the prepayment rate of the underlying mortgages. Because of this, the yield offered on Companion tranches is normally higher than that available on other CMO securities.

- **Z-Tranches**

Z-tranches (also known as Accretion Bonds or Accrual Bonds) are structured so that interest is not paid in cash until the bond begins to receive principal or until some other trigger is met. Instead, the face amount of the bond is increased on each payment date by the amount of the

interest due. Z-tranches often have an average life well in excess of ten years. These tranches are most frequently purchased by investors who have long duration targets and who want protection against reinvestment and prepayment risk.

- **Floating Rate**

Floating rate tranches are directly connected to an interest rate index, most commonly the London Interbank Offered Rate (LIBOR). The interest rate on these tranches resets periodically to account for changes in the underlying index rate. Because of the rate reset feature, these tranches bear less interest rate risk than most fixed rate CMO tranches. However, the floating rates are often subject to a cap, meaning that the tranche may not be able to completely track large increases in market rates. This does impose some degree of interest rate risk on the tranche.

- **Stripped mortgage-back securities** take the cash flows from the original mortgage pass-through and create two or more new securities, each receiving payments of principal, interest, or a combination of the two. When the mortgage-backed securities are completely stripped, they can take two forms: one that receives only the principal portion of cash flows (PO), or one that receives only the interest portion of cash flows (IO). Because they do not receive regular interest payments, PO securities are sold at a deep discount from face value. The large discount means that bondholders of PO securities benefit when homeowners decide to prepay their loans, as cash flow is returned to the investor sooner.

By contrast, holders of IO securities benefit when prepayments are low. This is because low prepayments leave a larger portion of principal outstanding for a longer period of time. The more principal outstanding, the greater the total amount of interest that is received from homeowners is then passed through to the holder of the IO.

As described above, PO and IO securities are extremely sensitive to loan prepayment rates. Accordingly, they are also extremely sensitive to changes in interest rates, as the level of interest rates is a primary driver behind prepayment behavior. As a result, IO and PO securities are often purchased by investors who have a higher-than-average tolerance for interest rate risk, or by investors who have an aggressive tactical view on the future direction of interest rates.

Benefits of Mortgage-Backed Securities

Mortgage-backed securities typically offer a higher yield than other types of high-quality fixed income securities. This is a result of the higher interest rates charged on mortgage loans relative to the interest rates paid on U.S. Treasury and government agency securities.

Additionally, MBS generally have extremely high credit quality ratings and a low probability of default or loss of principal. The most significant reason for this lies in the explicit and implicit government guarantees on the securities issued through GNMA, FNMA, and FHLMC. However, AAA-rated securities issued by private entities also bear little default risk, as the underlying properties act as collateral for the bonds. In the

case of default by a homeowner, the property may be sold and the proceeds passed through to the holder of the MBS.

Credit rating agencies such as Moody's Investors Service and Standard & Poor's Ratings Service rate bond issuers based on their perceived ability to pay interest and principal in a timely manner (see Figure 1).

Finally, because MBS securities are most often AAA-rated and currently constitute the largest sub-sector of the investment-

Figure 1: Credit Quality Ratings

Quality	Moody's ¹	Standard & Poor's ²
Investment-Grade		
Highest Quality	Aaa	AAA
Very Good Quality	Aa	AA
Good Quality	A	A
Medium Quality	Baa	BBB
Below-Investment-Grade		
Lower Medium Quality	Ba	BB
Low Quality	B	B
Poor Quality	Caa	CCC
Highly Speculative	Ca	CC
In Default	C	D

1. Moody's ratings from Aa to Ca may be modified by the addition of a 1, 2, or 3 to indicate relative strength within each category.

2. Standard and Poor's ratings may include a plus or minus to indicate relative strength within each category.

grade fixed income universe (35% of the Lehman Aggregate as of 9/30/05), they are generally very liquid investments. MBS can be traded in large volume to a wide variety of potential purchasers. As a result, trading costs are minimal.

Risks of Mortgage-Backed Securities

Mortgage-backed securities are generally more sensitive to interest rate movements than are other fixed income investments because of the effect that rate movements have on the prepayment behavior of homeowners. Depending on the prepayment speeds of the underlying mortgages, the average life, yield, and cash flow of the security may not conform to expectations at the time of purchase. If prepayment speeds are faster than expected, bondholders will face the risk of having the principal returned to them sooner than expected in a lower interest rate environment. If prepayment speeds are slower than expected, extension risk may occur, where the average life on the security is lengthened. This most often occurs in a higher rate environment when there will be less cash flow available to reinvest at more attractive yields.

Conclusion

Mortgage-backed securities are bonds that are backed by residential real estate loans, the payments from which are then distributed to various classes of security holders. These securities generally have a higher yield and credit quality rating than many other comparable investment alternatives. However, they also bear greater interest rate risk and have less cash flow predictability than most other securities. Each type of mortgage-backed security, from traditional pass-throughs to complex CMO tranches, has different risks associated with the mechanics of the payment process, and these risks need to be analyzed carefully before any investment is made.

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