Janus Henderson
INVESTORS

AGENCY MORTGAGE-BACKED SECURITIES (MBS)

A securitized products primer

WHAT ARE MORTGAGE-BACKED SECURITIES?

Mortgage-backed securities are collections of residential mortgages with similar characteristics that are packaged together, or **securitized**, and sold to investors. The cash flows (principal and interest payments) from the underlying mortgage loans are passed through to investors.

Agency MBS are issued or guaranteed by one of three government or quasi-government agencies: Fannie Mae, Freddie Mac, and Ginnie Mae. Because of this government support, the credit risk within agency MBS is considered negligible, similar to U.S. Treasuries.

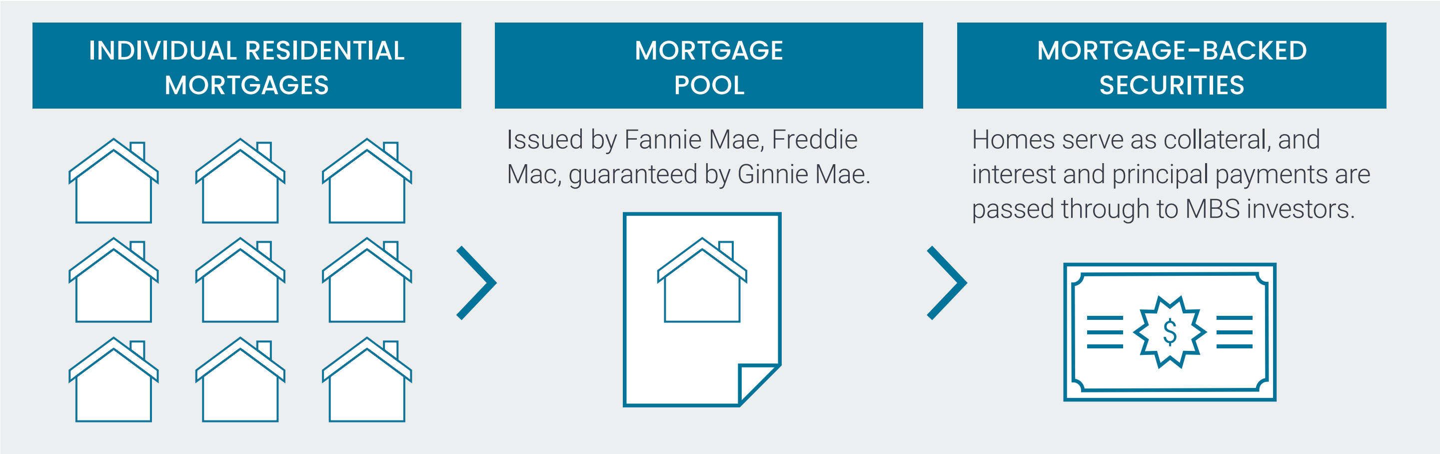
In contrast, **non-agency MBS** are created by private entities and do not carry a government guarantee. Non-agency MBS are typically comprised of residential mortgages that are unable to meet the criteria to qualify as conforming (or agency) loans.

Securitizations are financial instruments (bonds) created via the **bundling of contractual debt**, such as bank loans, mortgages, or auto loans. These bundles are repackaged into buckets – or tranches – and sold to investors. Investors receive the cash flows from the underlying loans (in the form of interest and principal payments) as a return on their investment.

U.S. SECURITIZED MARKET

Agency MBS	CMBS	CLO	ABS	Non-Agency MBS
Mortgage-Backed Securities	Commercial Mortgage-Backed Securities	Collateralized Loan Obligations	Asset-Backed Securities	Mortgage-Backed Securities

Agency MBS: From homeowners to investors

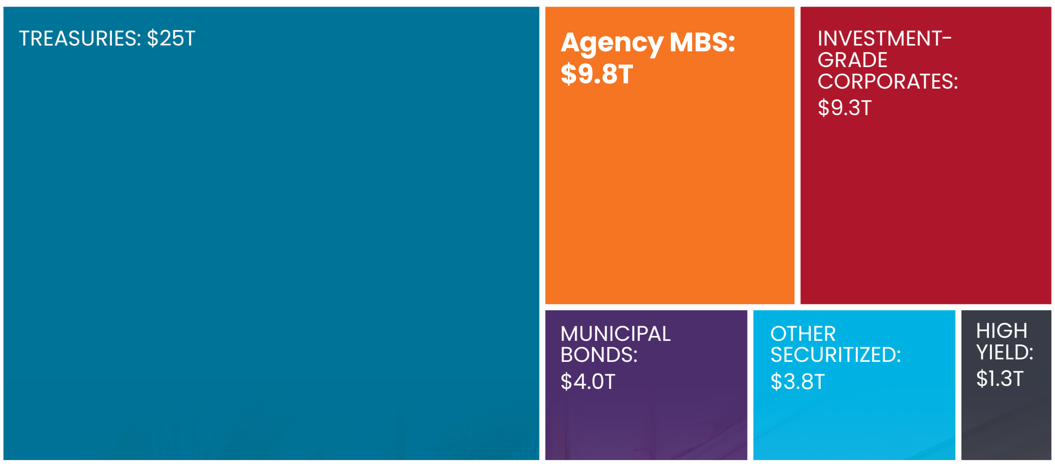


Size and history of the agency MBS market

Agency MBS have been around since the late 1970s. With their government backing, the market has grown into the second-largest and second most-liquid bond market in the world, behind only the U.S. Treasury market.

Agency MBS make up about 27% of the Bloomberg U.S. Aggregate Bond Index (U.S. Agg) and about 12% of the Bloomberg Global Aggregate Bond Index (Global Agg). Therefore, most investors with U.S. or Global Agg-like portfolios have exposure to agency MBS.

The $9.8 trillion agency MBS market represents a large investable universe for fixed income investors



As of December 2023, there are over 41 million mortgages outstanding in the U.S. - the vast majority of which are 30-year fixed-rate mortgages.

Source: SIFMA, BAML, as of December 2023.

Agency MBS vs. Treasuries

Due to their government guarantee, all agency MBS carry the U.S. government's AA+ credit rating. Therefore, the risk of principal loss is negligible.

While agency MBS and Treasuries issued by the U.S. government may carry equivalent credit ratings, these two types of bonds differ in several key areas:

	AGENCY MBS	U.S. TREASURIES
NUMBER OF BORROWERS	Millions of individual homeowners	Single borrower (U.S. Government)
CASH FLOW FREQUENCY	Monthly	Semi-annual
CASH FLOW COMPOSITION	Principal and interest	Interest only, with return of principal at end of term
PREPAYMENT RISK*	Yes	No
YIELD ABOVE U.S. TREASURIES	1.25% (30-year average)	N/A

* **Prepayment risk:** MBS are comprised of mortgage loans that could prepay sooner than expected. Borrowers may pay off or refinance their mortgage at any point, which would negate the future income on that mortgage. The uncertainty about when, or if, a borrower will prepay a mortgage is known as prepayment risk. MBS pay an additional yield, or spread, above the yield on a comparable U.S. Treasury to compensate investors for this risk.

Key characteristics of agency MBS

Investors may be inclined to focus on the state of the U.S. consumer and the U.S. housing market when considering an investment in agency MBS. But while these variables impact mortgage creation and delinquencies, they do not *directly* impact the value of MBS securities.

Valuations of MBS securities are sheltered from undulations in the housing market and rises in mortgage defaults due to their government guarantee. Any defaults or loan impairments are borne by the government, not the investor.

So, what does affect the valuation of MBS?

1. Prepayment risk

Prepayment risk is the primary fundamental risk for agency MBS. To understand how prepayments affect the prices of agency MBS, it is important to consider two key fixed income concepts: duration and convexity.

Duration measures the sensitivity of a bond's price to changes in interest rates – higher duration equates to higher price sensitivity, all else equal. **Convexity** takes the concept of interest-rate risk a step further, measuring how much a bond's duration changes in response to a change in interest rates.

PRICE CHANGE ON A HYPOTHETICAL 10-YEAR BOND

	No convexity	Positive convexity	Negative convexity
If rates rise 1%	-10%	-9%	-11%
If rates fall 1%	+10%	+11%	+9%

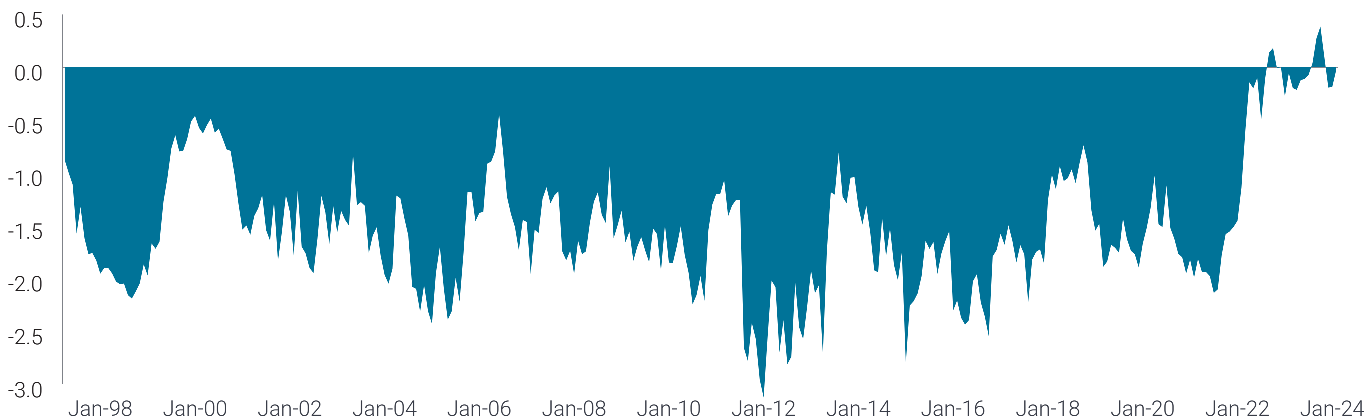
The duration of a bond with no convexity will remain *constant* amid fluctuations in interest rates. Therefore, its price will decrease and increase *proportionately* as interest rates rise and fall. Convex bonds will experience a *change* in their duration as interest rates fluctuate. As a result, they will experience *disproportionate* changes in price as interest rates move up or down.

Agency MBS typically exhibit negative convexity. This is because, when mortgage rates fall, borrowers have a greater incentive to refinance their existing mortgages. These refinancings result in capital being returned to investors sooner than anticipated, thereby lowering the duration of the MBS. As a result, the duration of the agency MBS decreases in a falling rate environment, lowering the amount by which the bond price would rise compared to a bond with no convexity. It is for this reason that agency MBS pay an additional yield (or spread) above the risk-free rate.

Convexity risk in agency MBS is not static. As shown below, it varies over time and is influenced by other factors such as borrower credit scores, state of origin, and the borrower's interest rate, to name a few. Because prepayments vary so greatly, active managers may seek out bonds with lower relative prepayment risk, or convexity, while still paying an attractive spread.

Bloomberg U.S. MBS Index convexity

Fluctuations in convexity and prepayment risk may provide opportunities for active managers to pursue improved risk-adjusted returns.



Source: Bloomberg, as of 31 December 2023.

2. Changes in interest rates

Most mortgages issued in the U.S. are long-term (30-year) fixed-rate mortgages. They have a meaningful amount of duration risk and are more sensitive to changes in interest rates than short-duration bonds. When rates fall, the value of MBS rise (albeit to a lesser extent than bonds with positive convexity), and vice versa.

3. Interest-rate volatility

Bonds with options (like MBS) are more sensitive to changes in interest-rate volatility than comparable non-option bonds. This is because the prepayment option (the ability to refinance the mortgage) held by the borrower increases in value as volatility rises.

4. Supply and demand

As is the case in any liquid market, forces of supply and demand affect the prices of MBS. The health of consumer balance sheets and the state of the housing market may influence the supply of mortgages, for example. Other factors impacting supply and demand may include the Federal Reserve's (Fed) monetary policy decisions, as well as the Fed's buying and selling from institutions such as banks, pensions, and insurance companies.

Most securitized products are pooled, or tranched, by credit rating (AAA, AA, A, BBB, etc.) and time until maturity. Agency MBS are all AA+ rated due to their government backing and are, therefore, not tranched by credit rating. Rather, agency mortgages are pooled by factors that influence their propensity to prepay, such as coupon rate, loan term, loan size, loan purpose (purchase or refinance), geography, loan-to value (LTV) ratio, and credit quality (FICO score).

Opportunities in a portfolio

Agency MBS can serve as a key component of a diversified fixed income allocation because they offer several opportunities for investors, including:

1. Strong credit ratings

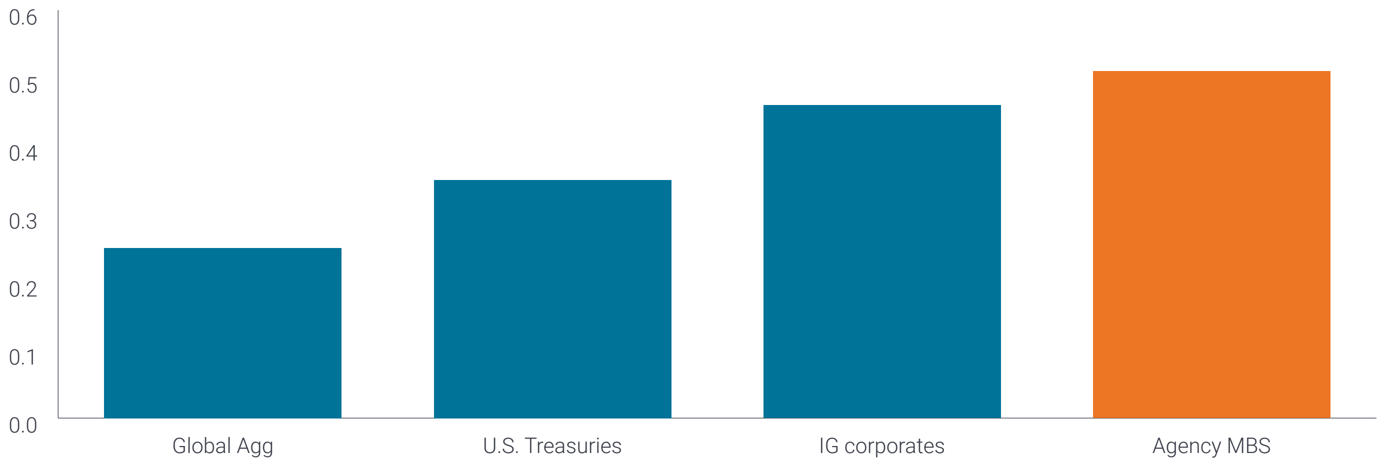
The strong credit ratings of agency MBS may help investors improve the overall rating of the portfolio while still earning a spread over the Treasury rate.

2. Improved risk-adjusted returns versus U.S. Treasuries

On an absolute basis, agency MBS have outperformed U.S. Treasury bonds over longer investment horizons due to their additional yield.[1] They have also outperformed on a risk-adjusted basis, as evidenced by their Sharpe ratios, which have been more like U.S. corporate bonds over time.

30-year Sharpe ratios

Agency MBS have had strong risk-adjusted returns over the long term.



Source: Morningstar, as of 31 January 2024. Sharpe ratios based on 30-year period from February 1994 to January 2024. See footnote 2 on p. 9 for indices used to represent asset classes. **Past performance does not predict future results.**

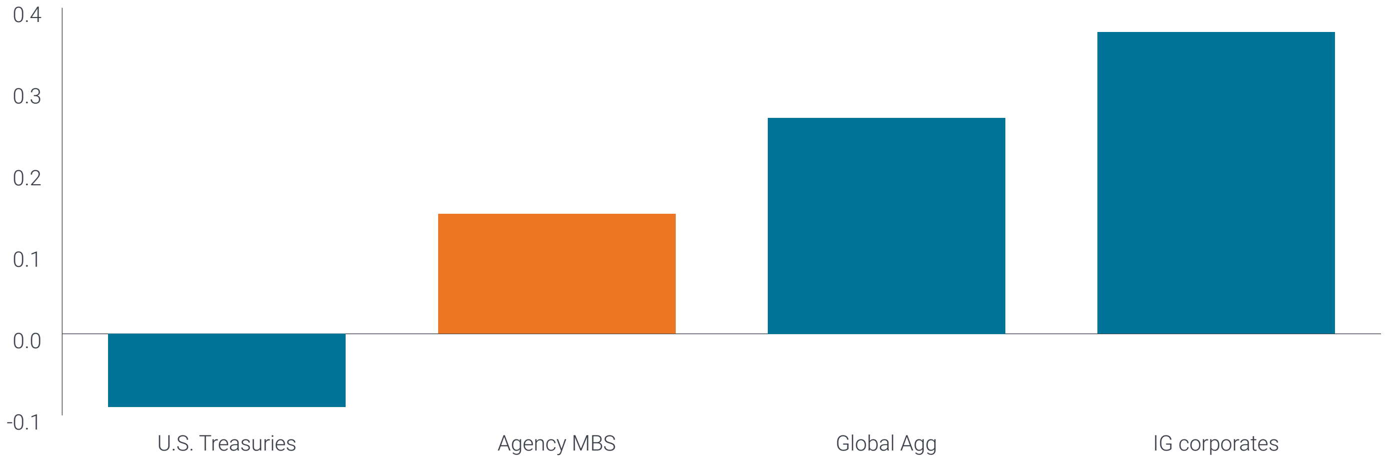
3. Diversification of risk exposures

Fixed income portfolios without an allocation to agency MBS are likely to be exposed predominantly to a combination of interest-rate and credit risk. While agency MBS carry prepayment risk, the fact that they lack the credit risk of other fixed income assets may allow investors to diversify the fundamental risks in their portfolios.

4. Defensiveness

Agency MBS have typically outperformed credit-spread sectors in times of crisis due to their longer duration and because their creditworthiness is not affected by market conditions or economic weakness. In times of market stress, long-duration and higher-rated bonds tend to rally as investors seek safety. As a result, MBS exhibit very low correlation to equities, making them a good diversifier for multi-asset portfolios.

Correlation of fixed income indices to the S&P 500® Index



Source: Source: Bloomberg, as of 31 December 2023. Monthly correlations for 30-year period from January 1993 to December 2023. See footnote 2 on p. 9 for indices used to represent asset classes. **Past performance does not predict future results**.

5. Liquidity

The agency MBS market is highly liquid and, therefore, well suited to trading when pricing inefficiences are identified.

Inefficiencies are a constant in the agency MBS market because borrower prepayment behavior is continually evolving based on interest rates and economic conditions. Further, prepayments are not only influenced by the current mortgage rate, but also by the historical path of rates that preceded a particular moment. Therefore, conditions in the agency MBS market are unique at any given time.

Active managers who are able to identify and respond to these changing conditions and correctly value agency MBS in light of these developments, may find opportunities for improved risk-adjusted returns.

A word on 2008

While some may associate all mortgage-backed securities with the Global Financial Crisis (GFC), agency MBS was, in fact, one of the best-performing asset classes through the crisis. The Bloomberg U.S. MBS Index recorded annual returns of +6.9%, +8.4%, and +5.9% in 2007, 2008, and 2009, respectively.

It is generally accepted that faulty sub-prime mortgages and other non-standard products that were packaged into collateralized debt obligations, or CDOs, proved to be the major contributing factor that led to the crisis.

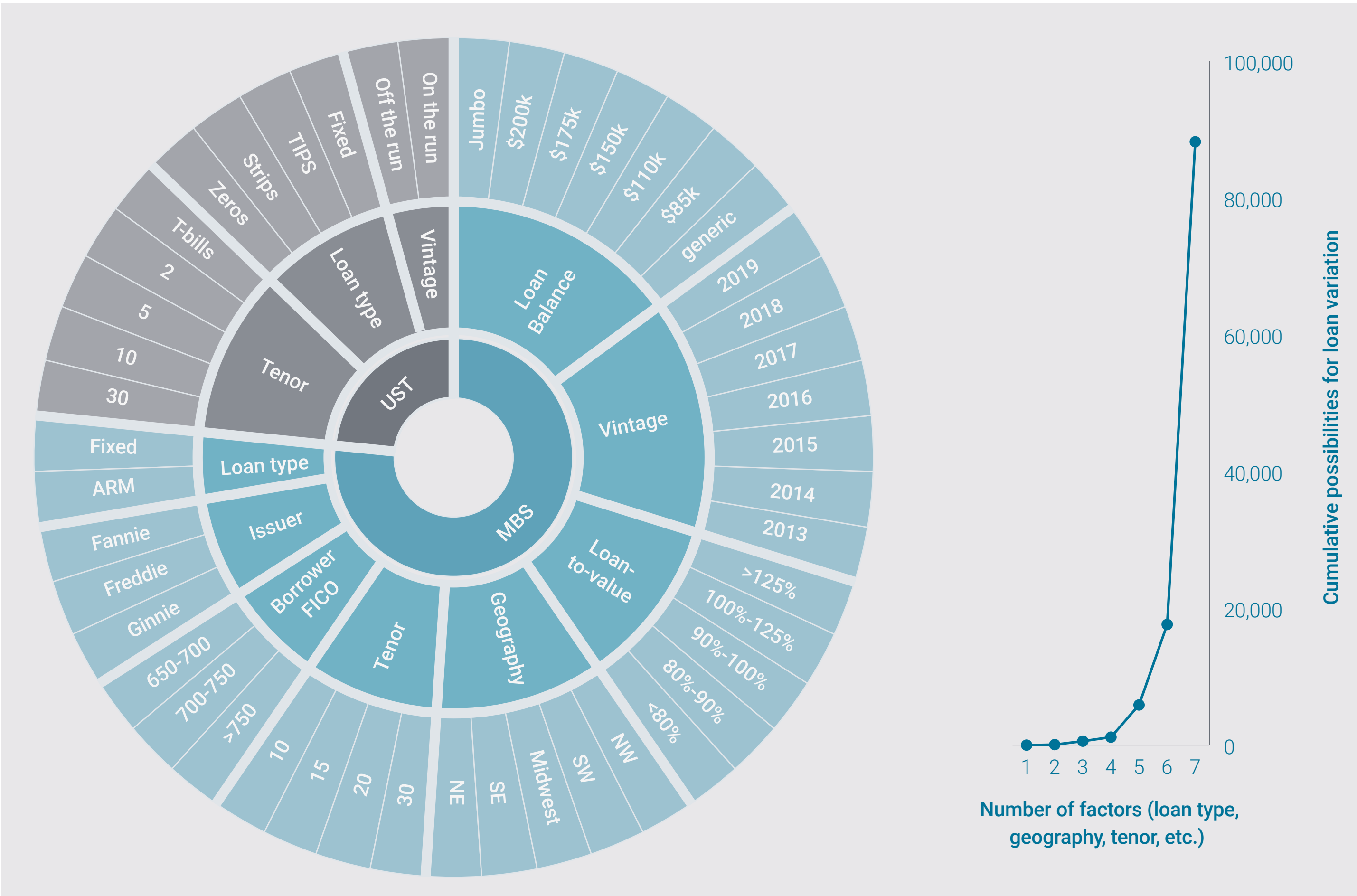
An active approach

There are two main reasons why the MBS market is attractive to an active fixed income manager.

First, the market's sheer size – in terms of value and number of loans – makes it an attractive sector for active security selection. Each MBS is comprised of a pool of loans with a unique geography of borrowers, as well as different credit ratings, loan-to-value ratios, and loan sizes. MBS have a high level of idiosyncratic risk (risk that is particular to a specific investment) due to the large number of factors affecting their prices, thereby providing ample opportunities for active managers.

Agency MBS security variation creates a larger opportunity set

The agency MBS market has a significant number of factors influencing bond prices.



Source: Janus Henderson. The factors shown are representative and are not comprehensive. For illustrative purposes only.

Second, a substantial proportion of MBS investors impact the market with non-economic motives, as they often transact for reasons other than acquiring yield at a market-clearing price. For example, commercial banks may transact to fulfill capital requirements. The Fed's motivation may be to support monetary policy goals. And foreign governments may buy MBS to increase their foreign currency reserves.

Regardless of the reason, the ulterior nature of these non-economic market participants' motivations can often distort MBS pricing, creating an opening for active managers to identify alpha opportunities.

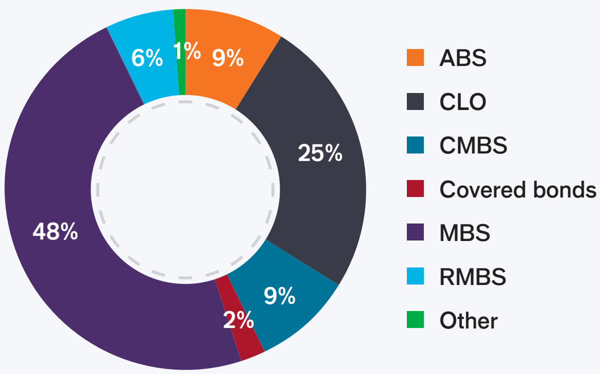
JANUS HENDERSON: SECURITIZED SPECIALISTS

We believe much of the value in active bond asset management comes from security selection. Characteristics of individual securities can vary widely, and it is the role of the asset manager – ideally armed with decades of experience and sophisticated analytic systems – to pick securities that offer better risk-reward potential and combine them into a portfolio with the yield and risk targets that investors seek.

We offer access to the growing and complex securitized market through our single-sector and full coverage products.

Janus Henderson securitized

$26.8B
in firmwide securitized assets



Source: Janus Henderson Investors, Bloomberg, Morningstar, as of 31 December 2023.
Note: Firmwide assets include securitized products available outside of the U.S. and securitized portions of other fixed income strategies.

Dedicated agency MBS expertise

John Kerschner, CFA
- Head of U.S. Securitized Products, Portfolio Manager
- 33 years of financial industry experience

Nick Childs, CFA
- Portfolio Manager
- 20 years of financial industry experience

Thomas Polus
- Associate Portfolio Manager, Securitized Products Analyst
- 10 years of financial industry experience

GLOBAL SECURITIZED PLATFORM

6 Portfolio Managers	9 Analysts
23 years average industry experience	13 years average industry experience

KEY INVESTMENT PARTNERS

Quantitative Research	Global Credit Research	Fixed Income Trading	Equity Central Research	Risk Management
4 analysts 12 years average experience	20 analysts 17 years average experience	15 traders 23 years average experience	35 analysts 17 years average experience	8 analysts 15 years average experience

[1] Relative returns for the 30-year period ended December 2023: Bloomberg U.S. MBS Index 4.27% annualized versus Bloomberg U.S. Treasuries Index 4.04% annualized.

[2] Indices used to represent asset classes: Global Agg = Bloomberg Global Aggregate Bond Index, U.S. Treasuries = Bloomberg U.S. Treasuries Index, Agency MBS = Bloomberg U.S. MBS Index, IG corporates = Bloomberg U.S. Corporate Bond Index.

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Janus Henderson INVESTORS

Investing involves risk, including the possible loss of principal and fluctuation of value.

The **Bloomberg Global Aggregate Index** is a flagship measure of global investment grade debt from a multitude local currency markets. This multi-currency benchmark includes treasury, government-related, corporate and securitized fixed-rate bonds from both developed and emerging markets issuers.

The **Bloomberg U.S. Asset-Backed Securities (ABS) Index** is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market. The index only includes ABS securities.

The **Bloomberg U.S. Aggregate Bond Index** is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market.

The **Bloomberg U.S. Commercial Mortgage-Backed Securities (CMBS) Investment Grade Index** measures the investment-grade market of U.S. Agency and U.S. Non-Agency conduit and fusion CMBS deals with a minimum current deal size of $300m.

The **Bloomberg U.S. Corporate Bond Index** measures the investment grade, fixed-rate, taxable corporate bond market. It includes USD denominated securities publicly issued by US and non-US industrial, utility and financial issuers.

The **Bloomberg U.S. Corporate High Yield Bond Index** measures the USD-denominated, high yield, fixed-rate corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch and S&P is Ba1/BB+/BB+ or below.

The **Bloomberg U.S. Mortgage-Backed Securities (MBS) Index** tracks fixed-rate agency mortgage backed pass-through securities guaranteed by Ginnie Mae (GNMA), Fannie Mae (FNMA), and Freddie Mac (FHLMC).

Mortgage-backed securities (MBS) may be more sensitive to interest rate changes. They are subject to extension risk, where borrowers extend the duration of their mortgages as interest rates rise, and prepayment risk, where borrowers pay off their mortgages earlier as interest rates fall. These risks may reduce returns

S&P 500® Index reflects U.S. large-cap equity performance and represents broad U.S. equity market performance.

Floating-rate yields: Floating-rate securities pay a yield that rises and falls with the prevailing interest rate, making their prices less sensitive to changes in rates.

Investment-grade securities: A security typically issued by governments or companies perceived to have a relatively low risk of defaulting on their payments. The higher quality of these bonds is reflected in their higher credit ratings when compared with bonds thought to have a higher risk of default, such as high -yield bonds.

Tranche: In securitized products like CLOs, a tranche is one of a number of related securities offered as part of the same transaction, with each representing a different degree of risk and carrying a commensurate credit rating.

Credit quality ratings are measured on a scale that generally ranges from AAA (highest) to D (lowest).

Concentrated investments in a single sector, industry or region will be more susceptible to factors affecting that group and may be more volatile than less concentrated investments or the market as a whole.

Correlation is a statistic that measures the degree to which two securities move in relation to each other.

Diversification is a common investment strategy that entails buying different types of investments to reduce the risk of market volatility.

A **collateralized debt obligation (CDO)** is a structured finance product that is backed by a pool of loans and other assets. The underlying assets serve as collateral if the loan goes into default. The tranches of CDOs indicate the level of risk in the underlying loans, with senior tranches having the lowest risk.

Derivatives can be more volatile and sensitive to economic or market changes than other investments, which could result in losses exceeding the original investment and magnified by leverage.

Actively managed portfolios may fail to produce the intended results. No investment strategy can ensure a profit or eliminate the risk of loss.

Index performance does not reflect the expenses of managing a portfolio as an index is unmanaged and not available for direct investment.

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