The Invesco White Paper Series
September 2016

What investors need to know:
US agency mortgage-backed securities

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In this paper, we highlight the many attributes we believe make the US agency mortgage-backed securities (MBS) market stand out among other large investable fixed income markets.

These attributes include:

- Market size
- Liquidity
- Low volatility
- High quality, collateralized security
- Attractive historic return
- Moderate duration
- Low correlation with other fixed income products

What are agency MBS?

Mortgage-backed securities are instruments whose cashflows are determined by borrower payments on an underlying pool of mortgage loans. US Agency MBS are guaranteed by Fannie Mae, Freddie Mac or Ginnie Mae, meaning that these entities are responsible for the timely payment of principal and interest on the bonds and bear the credit risk of the underlying loans. By relieving investors of this risk, they open up the mortgage market to a much deeper pool of capital and facilitate the availability of mortgage loans at potentially attractive rates.

Fannie Mae and Freddie Mac are US Government Sponsored Enterprises (GSEs). They are private companies that are not part of the US Government, though they are currently under the conservatorship of the US Treasury. However, they are considered to have an implicit guarantee from the US Government, with financial support in the form of lines of credit with the US Treasury. Ginnie Mae is part of the Department of Housing and Urban Development, and is thus backed by the full faith and credit of US Government, making credit risk on par with US Treasuries.

Market among the largest, most liquid

With US $5 trillion outstanding and average daily trading volume in excess of US $200 billion, the US agency MBS market is one of the largest and most liquid bond markets in the world.

The US agency MBS market offers a highly liquid market.

- The Bloomberg Barclays U.S. MBS Index has produced positive total returns in nine of the last 10 years, averaging 4.67% in 10 years going back as of 31 Dec. 2015, with return volatility of 2.68%, notably lower than the Bloomberg Barclays U.S. Corporate index at 4.26% and Bloomberg Barclays U.S. Treasury index at 3.45%.[1]
- US Agency MBS carry a rating commensurate with those of US government securities due to the guarantee of the GSEs.
- Over the past 10 years, the U.S. Agency MBS Index has had an average duration profile of 3.7 years. This is comparatively shorter than the Bloomberg Barclays U.S. Investment Grade Corporate Index average duration of 6.7 years and the U.S. Treasury Index average duration of 5.4 years during that time frame.[2]

1 Bloomberg Barclays U.S. MBS Index, Bloomberg Barclays U.S. Corporate Index, Bloomberg Barclays U.S. Treasury Index, 31 Dec. 2015
2 Bloomberg Barclays, 30 June 2016

Two broad MBS categories

While the breadth of different US agency MBS interest rate risk profiles is quite large, all investor types can generally choose from two broad categories — fixed-rate or hybrid adjustable-rate mortgages (ARMs). Fixed-rate agency MBS bonds are backed primarily by 30-year mortgage loans, but 15- and 20-year maturities also represent significant sections of the market. Alternatively, investors can choose shorter duration profiles in hybrid ARMs, in which collateral is structured with a certain fixed-rate period — commonly three, five, seven or 10 years — that then float off a specified index until maturity.

Fixed-rate agency MBS represents a large, very liquid component of the US agency MBS market and potentially offers these attractive attributes:

- Within the US fixed-rate agency MBS universe comprising 15-, 20- and 30-year maturity loan collateral, investors can choose mortgage coupons that fit their outlook on interest rates and prepayment behavior.
- Agency conforming loans give borrowers the option to prepay their loans. However, borrowers' inefficient reaction to prepayment opportunities tends to increase the outperformance potential of US agency MBS.
- Conventional loans backing agency MBS are not assumable, so loans are paid off when a property is sold.
- Life events — such as relocation, growing families, divorce, death or simply a change in income over a borrower's career — cause most mortgages to be paid off well before maturity.
- Conforming loans are also fully amortizing, and many loans are refinanced or curtailed as borrowers make higher monthly payments to reduce their debt.

For all these reasons, US agency MBS tend to have shorter average lives and shorter durations than most casual observers realize. US Agency MBS market yields are generally higher than other government guaranteed securities to compensate for the cash flow uncertainty associated with the borrowers right to pre-pay their loan before maturity. Consequently, US agency MBS have the potential to benefit from periods of range-bound rates, low volatility, and tight lending standards because these conditions limit the value of the borrower's prepayment option.

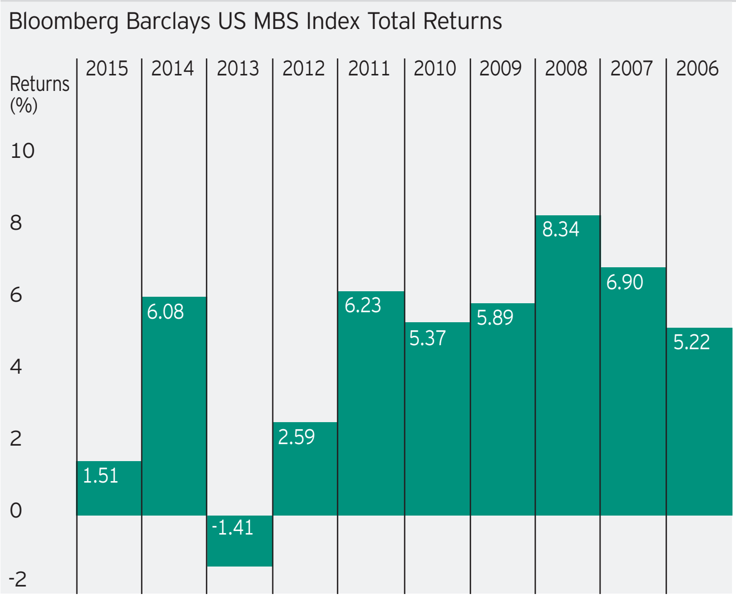
By purchasing **hybrid ARMs**, the risk of rising interest rates can be mitigated. Hybrid ARMs benefit from higher interest rates as the underlying mortgage rate resets, higher interest payments and greater yield. Hybrid-ARM MBS also generally have a lower duration profile due to the significantly shorter fixed-rate periods compared with fixed-rate loans.

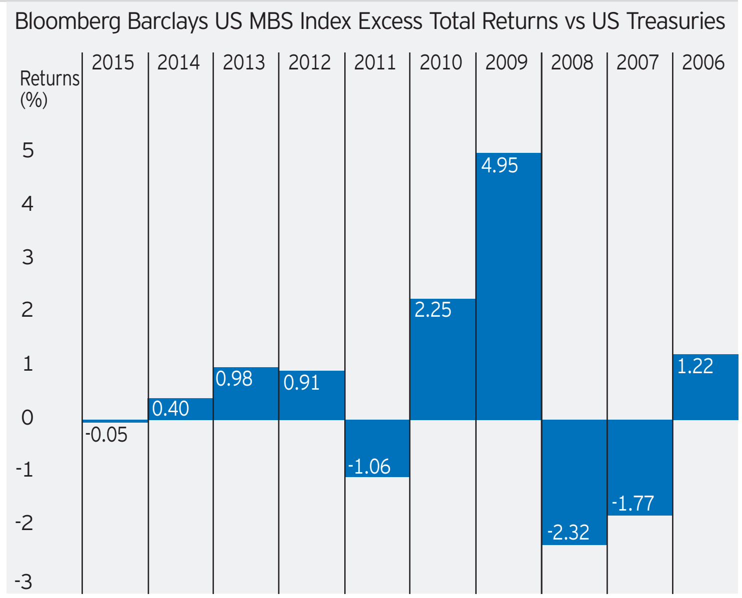
Why consider MBS

We believe there are three key reasons to consider investing in US agency MBS:

1. Attractive return profile: Over the prior decade, US agency MBS have on average produced strong returns across many market cycles, including Global Financial Crisis of 2007-2008. On average, the Bloomberg Barclays MBS Index produced total returns of 4.67% over that time period. The charts below show this return profile.

US MBS Have Offered an Attractive Return Profile Over the Last Decade

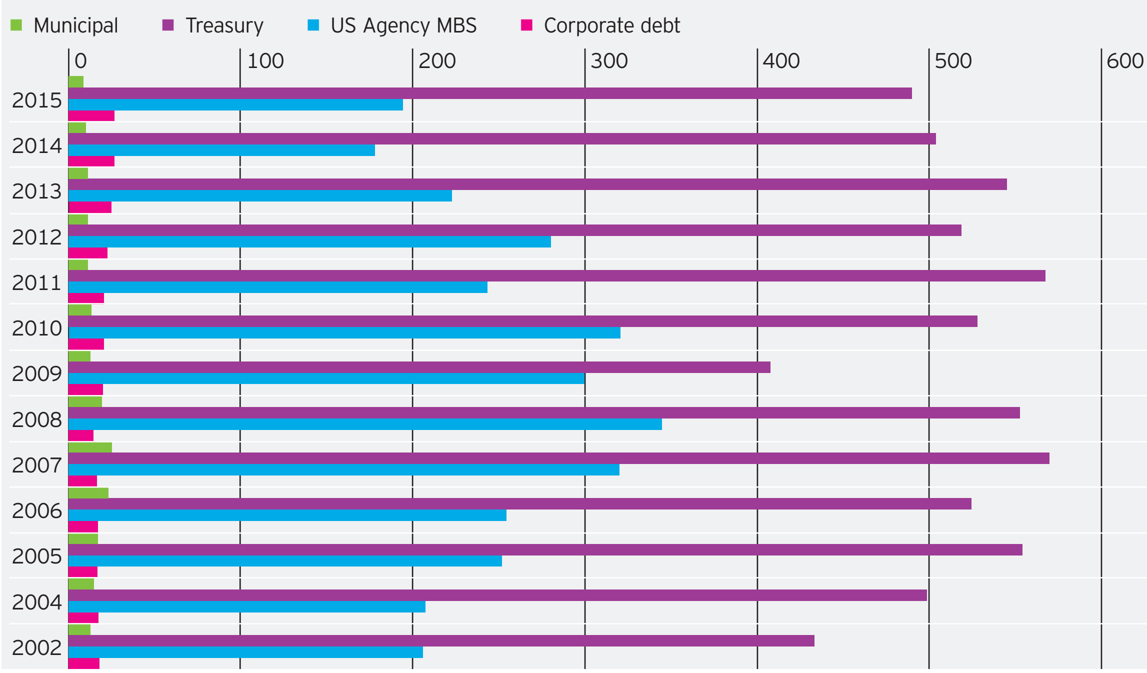




Source: Bloomberg Barclays, 31 Dec. 2015

2. Liquidity: US Agency MBS offer the deep liquidity of a high-quality government-sponsored security with average daily trading volume of US $194 billion, according to SIFMA bond market statistics shown below, compared with US $26 billion for US corporate debt.

Average Daily Trading Volume Comparison of Highly Liquid Bond Markets (in billions)

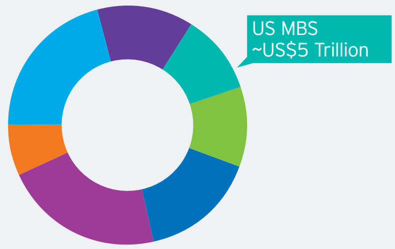


Source: SIFMA 31 Dec. 2015

US Agency MBS also constitute 11% of the Global Aggregate Bond Market Indices, as shown below.

Global Aggregate Bond Market Indices Have over US$47 Trillion Market Value

US agency MBS reflects a meaningful representation of the global fixed income market as of 30 June 2016



	%		%
US MBS	11	EUR Credit	7
US Corp	10	APAC Gov't	21
US Gov't	16	All Other Markets	13
Pan-Eur Gov't	22		

Source: Bloomberg Barclays Global Indices as of 30 June 2016 – Bloomberg Barclays U.S. MBS Index (US MBS), Bloomberg Barclays U.S. Corporate Index (US Corp), Bloomberg Barclays U.S. Government Index (US Gov't), Bloomberg Barclays Pan-European Aggregate Government Index (Pan-Eur Gov't), Bloomberg Barclays Asian-Pacific Government Index (APAC Gov't), Bloomberg Barclays Pan-European Aggregate Credit Index (EUR Credit), All other markets is the catch all for all other components of the Bloomberg Barclays Global Aggregate bond Index.

The notable scale of US agency MBS provides meaningful liquidity, but liquidity can also be measured in terms of the bid-ask spread. The US agency MBS to-be announced (TBA) market bid-ask is typically 1/32nd of a point, while hybrid ARM and fixed-rate agency MBS securities typically trade at a 2/32nds bid-ask spread. For purposes of comparison, 10-year investment grade corporate bonds can have a bid-ask spread of anywhere from 4 to 16/32nds, making them comparatively more expensive to transact.

3. Low Duration: In terms of return per unit of duration risk, US agency MBS currently compare favorably with other major bond asset classes. The U.S. MBS Index currently reflects an average duration profile of approximately 2.5 years, compared with the 7.4-year duration profile of the U.S. Corporate Index.

Global Investment Grade Yield vs. Rate Risk Profile

US MBS offers attractive yield to maturity/duration profile as of 30 June 2016

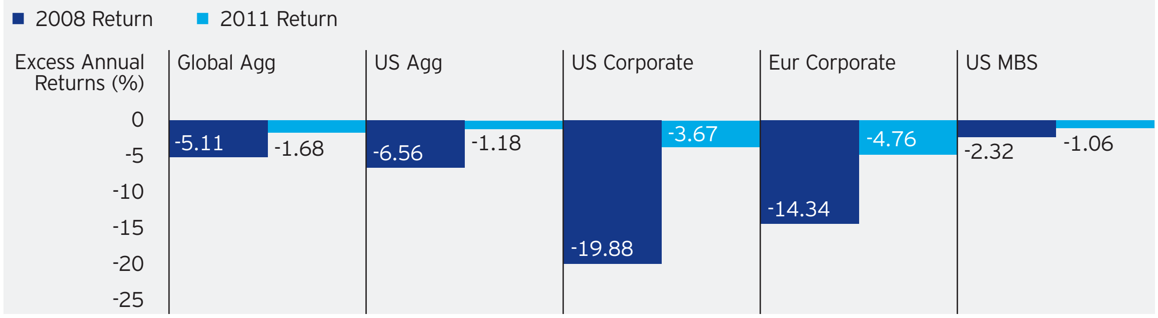
Bloomberg Barclays Global Indices as of June 30, 2016 - Bloomberg Barclays US Aggregate MBS Index, the Bloomberg Barclays US Aggregate Crporate Index, the Bloomberg Barclays US Aggregate Treasuries Index, the Bloomberg Barclays Pan-European Aggregate Corporate Index, the loomberg Barclays Asian Pacific Aggregate Corporate Index, the Bloomberg Barclays Asian Pacific Aggregate Government Index and the Bloomberg Barclays Pan-European Aggregate Government Index.

How US agency MBS performed in times of stress

During the recent global recessions, US agency MBS outperformed most major global bond indices, as shown below. US Agency MBS benefited from a flight to quality bid even as the Government Sponsored Enterprises (GSEs) were taken into conservatorship. Additionally, strong liquidity and backing by high-quality, well-underwritten residential loans added to their attractiveness on a relative basis.

Excess[3] Returns in Stressed Market Conditions[4]

US agency MBS has outperformed in periods of crisis



3 Excess returns are the return relative to equal duration treasuries.

4 Bloomberg Barclays Global Aggregate Bond Index (Global Agg), Bloomberg Barclays U.S. Aggregate Bond Index (US Agg), Bloomberg Barclays U.S. Corporate Index (US Corporate), Bloomberg Barclays Euro-Aggregate Corporate Index (EUR Corporate), Bloomberg Barclays U.S. MBS Index (US MBS)

Cautions for investors

Investors in US agency MBS should be aware of:

- **Prepayment Risk.** MBS can be subject to a higher level of borrower prepayments on loans should mortgage rates fall. This, in turn, subjects the investor to reinvestment risk. Similarly, if interest rates rise and prepayments generally slow, MBS will extend as principal payments slow.
- **Convexity.** A measure that captures the tendency of an MBS duration to extend when interest rates rise and shorten when interest rates decline.
- **Duration, a measure of bonds' interest rate sensitivity.** A bond portfolio with relatively high duration is typically exposed to higher interest rate risk. As yields rise, a bond with positive duration will likely decline in price.
- **Option-adjusted spread (OAS).** The yield spread relative to US Treasuries of a US agency MBS bond is adjusted for the underlying borrower prepayment option. OAS spread changes can impact the bond price positively if tighter, but negatively if wider.

How we analyze US agency MBS

The Invesco Fixed Income team responsible for US agency MBS investing continuously reviews the regulatory environment, housing and borrower demographics, prepayment trends, interest rate volatility, mortgage supply and demand and valuation metrics. Other economic indicators provide insight about the strength of the housing market, including employment, affordability, inventory and local trends. The team's views on macro housing and interest rate trends shape opinions on relative value across US agency MBS subsectors.

With those and other key mortgage market inputs, the Invesco Structured Securities team (part of Fixed Income team) constructs US agency MBS portfolios optimized for wider team's views and actively manages portfolios for changes in those views and other relative value opportunities.

Examples of Historical Loan Underwriting Trends

Vintage	CLTV Ratio	Fico Score	DTI %	D180 %	HPI % YOY
2002	73.9	722	34.0	1.6	12.22
2007	75.2	724	39.3	14.0	-9.04
2013	75.7	763	33.0	0.1	13.46

Sources: Conforming loan underwriting and performance data from Fannie Mae CLTV (combined loan to value), DTI (debt to income), D180 (cumulative loans delinquent 180 days or more), HPI YOY (home price inflation year over year)

Outlook

We believe US agency MBS currently offer an attractive risk-adjusted return profile, the deep liquidity of a very large market, government quality and comparatively low duration. Today, we believe conforming loans eligible to back US agency MBS benefit from tight lending standards which constrains market supply and supports the potential for positive investment performance in longer term.

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