Alternatives 101

An introduction to MBS

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"Alternatives 101 is a series of investment primers on alternative asset classes. In this series, we want to provide an overview of the investment landscape, as well as the benefits and risks of investing in these asset classes in order to help trustees of pension funds, investment advisers, and portfolio managers make better investment decisions. Timeless in nature, these reports are intended to help anyone new to a specific alternative asset class get up to speed. In this edition, we will focus on Mortgage Backed Securities (MBS)."

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Introduction

Back in November 2018 we published an Alternatives 101 primer on asset backed securities (ABS). Mortgage backed securities (MBS), the subject of this note, are one subset of the ABS universe, specifically those which, directly or indirectly, reference pools of mortgage loans. MBS have been around as long as ABS have, with the market starting to get going in the US in the 1980's.

Unlike other types of bonds, which typically pay periodic interest and return the principal in one lump sum at maturity, MBS make interest and principal payments to investors on a monthly basis. This means that MBS investors receive their principal back over the life of the investment, not just at maturity. The monthly mortgage-related payments made by the property owners are passed through to the MBS holders, hence the common term for one type of MBS – "pass-through". As the property owners can prepay their mortgage loans in advance, the size of the MBS monthly payments and the bond's maturity can only be estimated at launch, and they generally vary over time. In addition, property owners may refinance their mortgages or sell their properties. For these reasons, the attributes of MBS are less predictable than for other bonds.

In this note, we start off by briefly mentioning some of the different types of MBS that currently exist, in what is an ever-developing market. Next, the typical structures of MBS bonds are described, highlighting their built-in protections and other features. The current size of the market and its historical development is then discussed – in aggregate, there was estimated to be $9.7tn of outstanding MBS in the US as at 30 September 2018, with a further $900bn in Europe (as at 30 June 2018). Following this, some important risk considerations are described, together with the general performance-related attributes (both current and historical) of MBS securities.

These points, and others, are then brought together in a section which highlights the benefits that MBS can bring to a portfolio of other investments. Towards the end, we briefly discuss the treatment of MBS under Solvency II, which has had the effect of limiting insurance companies' investment in the sector. Finally, a summary of the MBS investment proposition is given.

It should be said that MBS constitute a niche, specialised and complex sector which, as a result, does not receive much accessible research coverage. This means that experienced MBS fund managers are able to consistently find value, increasing their chances of delivering attractive returns to investors.

The MBS universe

There is a wide range of different types of MBS that are accessible to investors, predicated on the different types of mortgage loans that exist. The MBS bond holder just receives the payments passed through from the reference pool of mortgage loans. At the highest level, MBS reference pools of mortgage loans backed either by residential ("RMBS") or commercial ("CMBS") property as collateral. Given the relative sizes of the RMBS and CMBS markets, we will focus on the first of these MBS "flavours" in this note.

MBS are typically issued by financial institutions such as investment banks and building societies. In the US, they can also be issued by government-sponsored enterprises ("GSE", or agencies), of which there are three: the Federal National Mortgage Association ("Fannie Mae"), the Government National Mortgage Association ("Ginnie Mae"), and the Federal Home Loan Mortgage Corporate ("Freddie Mac"). If a US MBS has one of these three agencies as a backer/originator, then it is labelled as an "agency" MBS, otherwise it is termed "non-agency". With a market size of more than $8tn currently, agency MBS is the largest and most liquid fixed income asset class in the US after US Treasuries, ahead of corporate bonds.

The most important differences between the three US agencies are that Ginnie Mae is a government corporation that explicitly guarantees the interest and principal payments on the federally-insured loans. MBS issued by Ginnie Mae, therefore, have the highest credit rating (equivalent to that of the US government) and are treated the same as US treasuries, from a risk-weighted capital perspective, by the regulators. Fannie Mae and Freddie Mac, on the other hand, are privately-structured entities with shareholder capital created to acquire conventional (non-government backed) mortgages. Given their importance to the overall US financial system and their position as GSEs, Fannie Mae and Freddie Mac MBS operate under an implicit, rather than an explicit, guarantee from the US government.

As suggested earlier, there are a large number of different types of mortgages underpinning (non-agency) RMBS in the US – some of these are shown in the table below, together with the outstanding amounts as at the end of Q3 2018. Others include option adjustable rate mortgages (ARM), Alt-A, qualified and non-qualified mortgages.

Fig 1: US (non-agency) RMBS outstanding

Mortgage type	Amount ($,bn)	Amount (%)
Subprime/non-prime	363.9	42.6%
Scratch & dent (re-performing)	113.6	13.3%
Jumbo prime	106.4	12.4%
Resecuritisation	67.5	7.9%
Others	203.3	23.8%

Source: SIFMA, Fidante Partners. As at 30 September 2018.

In addition, there are a range of different types of CMBS mortgages, including those shown in the table below.

Fig 2: US (non-agency) CMBS outstanding

Mortgage type	Amount ($,bn)	Amount (%)
Conduit/fusion	349.9	65.7%
Single asset/single borrower	131.2	24.6%
Others	51.9	9.7%

Source: SIFMA, Fidante Partners. As at 30 September 2018.

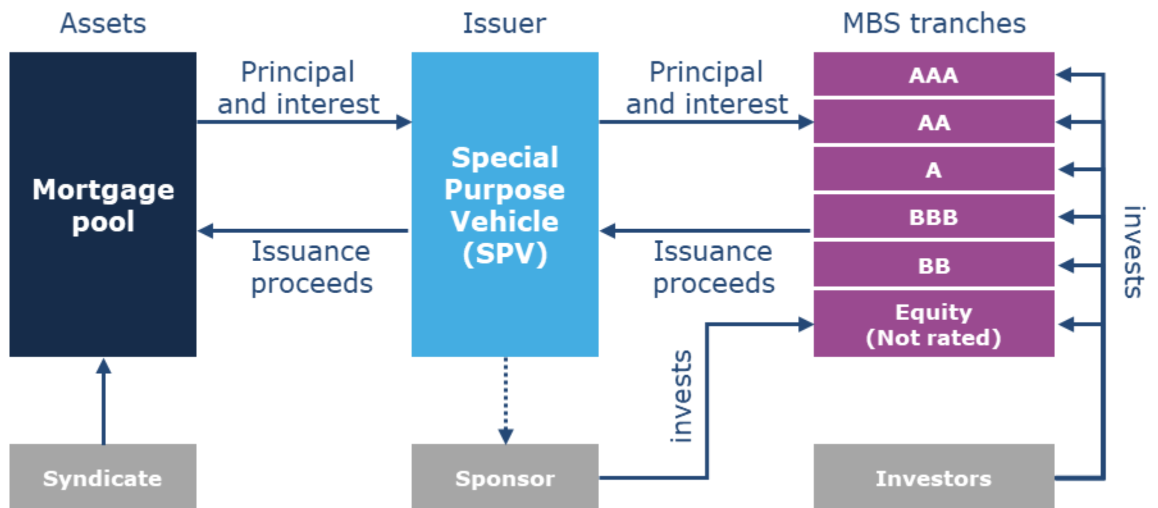
Another security related to MBS is the collateralised mortgage obligation (CMO), which is a bond which has pools of existing pass-through MBS, or mortgages, or some combination of both, as collateral. These were also introduced early on, in the 1980's, to satisfy the needs of those investors that required the principal to be repaid in a more structured way, and less frequently, compared to pass-through MBS. CMOs have been issued in the US and fall under the agency umbrella.

Structure of non-agency MBS

We discuss below the structure of non-agency MBS bonds - agency MBS bonds and CMOs are structured rather differently, as briefly mentioned later.

At the outset of an MBS transaction, a special purpose vehicle (SPV) is set up by the sponsoring entity – this is the legal entity which issues the MBS bonds to the end investors. The SPV purchases the underlying pool of mortgages, from a financial institution, which funds the payment of the coupons on the bonds and the repayment of the principle amounts. The interest payments made by the MBS are typically fixed rather than floating, given that they reference fixed-rate mortgage loans, but there is a small universe of floating rate, or hybrid, MBS.

Fig 3: MBS structure, cash flows and capital structure



Source: Fidante Partners.

An MBS transaction results in the issuance of multiple bonds, with tranches differing by seniority, maturity and currency. Senior MBS at the top of the structure may be AAA-rated, while the more junior mezzanine tranches may be BB- or B-rated. The cashflows from the underlying mortgages pay the tranches in turn, flowing down the structure, from the senior to the junior tranches. The risks associated with holding a given tranche of MBS depend on the quality of the collateral and the probability of default in the underlying mortgage pool. If there are any defaults, then the seniority of the tranche in the MBS structure becomes important, with the junior tranches being affected first. To compensate investors for the risk taken, the junior tranches offer higher returns than the more senior tranches. This structure allows investors to target specific tranches depending on their appetite for risk and yield.

MBS typically come with several structural protections:

- **Equity cushion** – This is the difference in the value of the assets held and the underlying loans used to finance the acquisition of those assets. For example, a £100m property pool may be linked with a mortgage pool of £75m which forms the reference pool for a particular MBS. Before the holder of the MBS suffers losses arising from falling property prices, these prices would have to decline by £25m (25%), the owners of those properties would need default on their mortgage payments, and the other protections below would need to be exhausted.
- **Excess interest** – The interest over and above that needed to pay the MBS coupons normally goes to the issuer of the MBS (the equity holder of the SPV). However, if there is a loss on the sale of a defaulted property or deterioration in the credit quality of the underlying pool, the excess interest is diverted to cover any losses, for

the most senior tranches initially, providing additional protection for the MBS holder.

- **Reserve fund** – This is a cash account set up by the issuer which acts as a further cushion for protection that can be drawn down to offset any losses.

Once these three layers of protection are exhausted, further losses are allocated to the most junior tranche first. If and when that tranche is written down to zero, the next most junior tranche will start to accrue losses. Thus, the most senior tranches benefit from additional protection. This is referred to as subordination, and collectively the three layers of protection plus the subordination provide what is called "credit enhancement".

MBS risks generally reduce with time. As the underlying mortgage loans are paid down, the outstanding principal is reduced, and rising property prices improve the value of the underlying collateral. As the underlying mortgages amortise, through scheduled monthly repayments and prepayments, the relative size of the protection layers generally increase.

Structure of agency MBS and CMOs

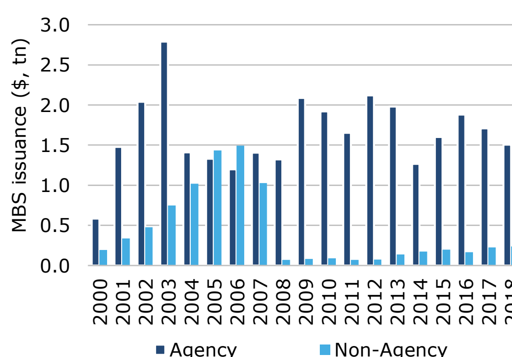
Agency MBS issued in the US do not fall into the structure outlined above, principally due to the fact that the bonds have an explicit or implicit guarantee from the US government. Given this backing, these securities are not "tranched" into different credit risk buckets – they all bear the same (essentially zero) credit risk. The protection afforded agency MBS means that they are associated with a lower risk of default, but this positive aspect is naturally offset by their lower return potential (in the absence of market stress).

CMOs are different again. They are split into graduated risk classes, or tranches, with class A of the CMO being the highest risk, and highest paying, tranche, referencing longer-term mortgages with longer to run until the scheduled full repayment by the borrowers. The class A tranche is therefore exposed to the highest interest rate, default and prepayment risks, and would be the first of the tranches to absorb losses from the borrowers' failure to make payments. However, they are also the first to receive the proceeds from prepayments. By contrast, class C of a CMO carries the least risk but also offers a lower rate of return, as the mortgages backing this class of a CMO tend to be approaching their full repayment date. This means that the CMO holder to a large extent receives only interest together with, perhaps, some principal payments over the remainder of the term of the mortgage. Class Z of a CMO is yet another tranche of risk, and one of the riskiest of all, as it does not receive any interest or pre-payments of principal until all the other tranches have been paid. As mentioned earlier, CMOs are suited to those investors who need more predictable payments.

The MBS market – issuance and size

The Securities Industry and Financial Markets Association (SIFMA) has compiled and published historical data on US MBS issuance and outstanding amounts. The first chart below shows the issuance between the start of 2000 and November 2018 for agency and non-agency MBS. The rapid increase in non-agency MBS issuance in the years leading up to 2006, prior to the start of the Global Financial Crisis (GFC), and the subsequent sharp decline, can be clearly seen. There has been a gradual recovery in non-agency MBS issuance over the last few years and 2018 will be the best year since 2007 in this regard. By contrast, the implicit or explicit backing of the US government meant that losses for holders of agency MBS during the GFC were not as widespread as for their non-agency counterparts, with the consequent effect that issuance held up relatively well throughout.

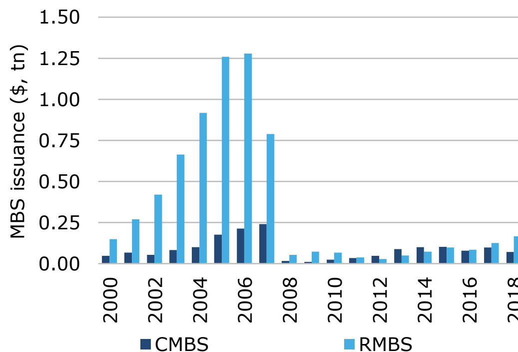
Fig 4: US MBS issuance ($, tn)



Source: SIFMA, Fidante Partners. To 30 November 2018.

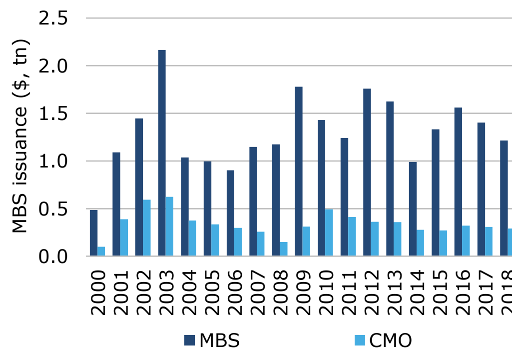
Both RMBS and CMBS non-agency issuance suffered in the aftermath of the GFC, however the scale of the decline was most marked for RMBS, which had seen the largest issuance in the prior period. CMO issuance, as a percentage of total agency MBS issuance, has averaged about 20% since the turn of the century.

Fig 5: US MBS issuance – non-agency ($, tn)



Source: SIFMA, Fidante Partners. To 30 November 2018.

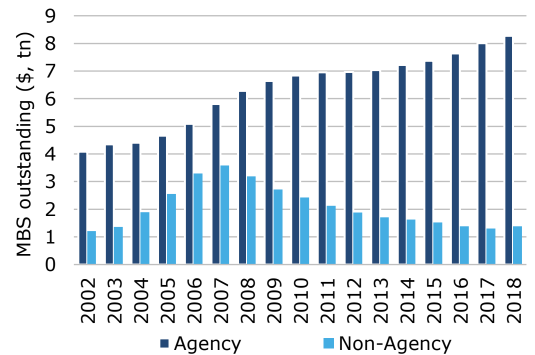
Fig 6: US MBS issuance – agency ($, tn)



Source: SIFMA, Fidante Partners. To 30 November 2018.

The net effect of this issuance, and the corresponding redemptions, over time has resulted in a gradual increase in the outstanding amount in US agency MBS, which stood at $8.3tn as at 30 September 2018, while the non-agency outstanding amount stabilised at around $1.4tn after having peaked at $3.6tn in 2007.

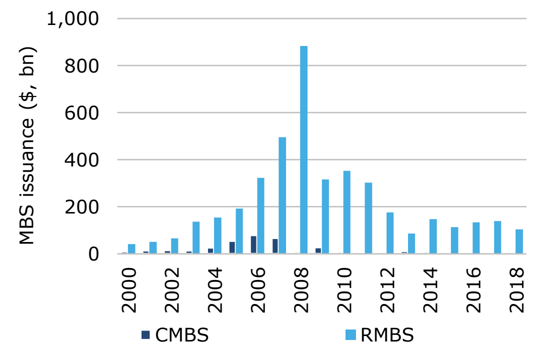
Fig 7: US MBS outstanding ($, tn)



Source: SIFMA, Fidante Partners. As at 30 September 2018.

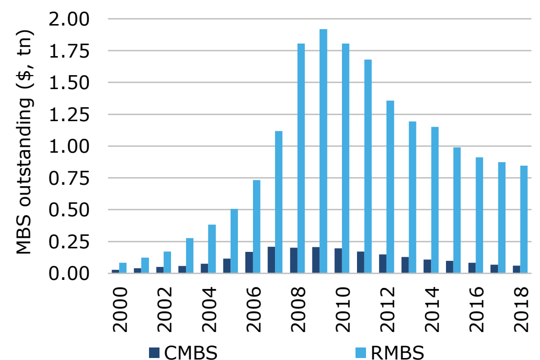
The data provided by SIFMA shows that European MBS issuance, which has always been dominated by RMBS, also fell post the GFC. The outstanding amounts have also fallen over the last decade, but as for US non-agency MBS, the decline has tapered off in recent years. The end effect is that the outstanding amounts were around $850bn and $60bn for RMBS and CMBS, respectively, at the end of Q2 2018.

Fig 8: European MBS issuance ($, bn)



Source: SIFMA, Fidante Partners. To 30 September 2018.

Fig 9: European MBS outstanding ($, tn)



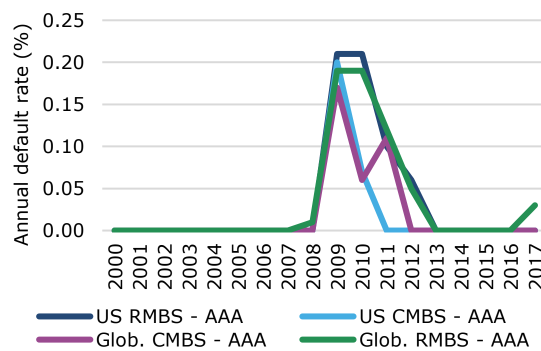
Source: SIFMA, Fidante Partners. As at 30 June 2018.

Risks associated with MBS

There are a number of risks associated with MBS investments, including:

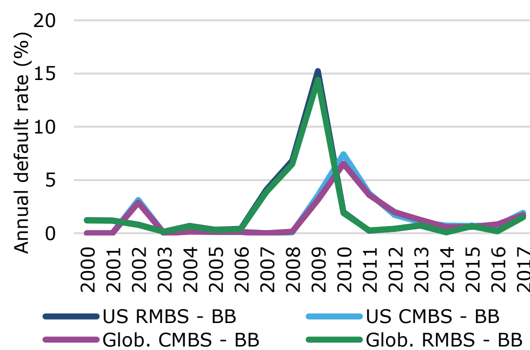
- **Interest rate risk** (or **duration**) – This quantity denotes the sensitivity of the valuation of the MBS bond with respect to changes in interest rates. Rising or falling rates have an impact on MBS prices as they affect the underlying mortgage loans (via prepayment rates and the average life of the MBS).
- **Credit risk** – For non-agency RMBS and CMBS, this is denoted by the tranche credit rating and is driven by a number of fundamental characteristics of the security itself, such as the quality of the collateral, the defensiveness of the MBS structure, and the geographical spread of the underlying pool of mortgages. Ratings are determined independently by the ratings agencies and are based on a detailed assessment of these, and other, factors. For most, but not all, AAA-rated RMBS and CMBS, default rates have remained low throughout the period since the turn of the last century. This has generally been true for BB-rated MBS bonds as well (less than 2% one-year default rates), except for around the time of the GFC. Here, global RMBS default rates reached over 14%, while the peak figure for global CMBS was 6.5%.
- **Credit spread duration –** This is the sensitivity to changes in credit spreads, that is, how much the credit spread of an ABS bond changes when the credit spread of a similarly-rated bond with a duration of one-year changes. Credit spreads tend to decline when the economy and markets are healthy and widen during periods of difficulty. In addition, they can be volatile and subject to sudden movements in response to specific events. It is through this sensitivity that price volatility occurs in the MBS sector.
- **Prepayment risk –** This is the risk that the homeowners pay off their mortgages faster than originally envisioned by making higher-than-required monthly payments, refinancing their loans, or selling their properties. The level of prepayments is subject a number of market factors – for example, they usually occur when interest rates decline. As the principal is returned sooner than expected when prepayments are made, MBS holders may be forced to re-invest at lower prevailing yields.
- **Extension risk –** By contrast to prepayment risk, this is the risk that the homeowners will not pay off their mortgage loans as soon as expected, resulting in an extension of the average life. If this occurs, mortgage investors may end up holding bonds with longer maturities than expected, and the yield may or may not keep up with rising inflation or market interest rates.

Fig 10: One-year default rates for MBS (AAA-rated)



Source: S&P Global, Fidante Partners.

Fig 11: One-year default rates for MBS (BB-rated)



Source: S&P Global, Fidante Partners.

Of the risks listed, it is prepayment risk that is most specific to MBS when compared to other types of bonds. The modelling of this risk for any particular MBS security introduces a further level of complexity into MBS investing.

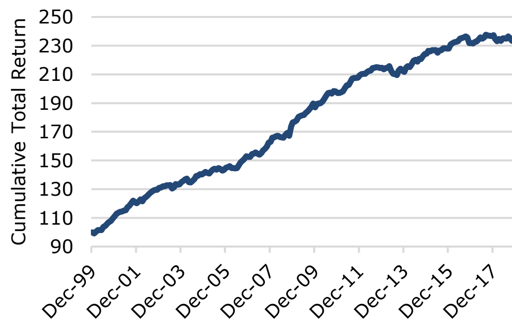
MBS performance

The total return from an investment in an MBS bond over a defined period comes from a combination of the price change between entry and exit and the income and payments of principal received while invested.

The chart below shows the cumulative return for US MBS in aggregate, for all MBS types and credit ratings, over the period since the end of 1999 (there is no such index for European MBS). Given that agency MBS constituted a large part of outstanding MBS over entire period, and the fact that these securities experienced less of a drawdown during the GFC, the overall performance of the index was steady throughout this period (non-agency RMBS, by contrast, experienced sharp falls). The largest losses occurred in mid-2013 (down 2.8% in the four months to 31 August 2013 – this was around the time of the "Taper Tantrum" in the US) and performance has tailed off in recent years (the annualised return over the last 12 months has been -0.5%). MBS performance at a more granular level, for example in terms of the type of underlying mortgage and the credit rating, would be expected to have generated rather different, more extreme, total return behaviour relative to the average over the period.

The 4.6% annualised return for US MBS over the near 19-year period since the end of 1999, with an annualised volatility of just 2.6%, is attractive on a risk-adjusted basis.

Fig 12: Total return for aggregate US MBS ($, unhedged)



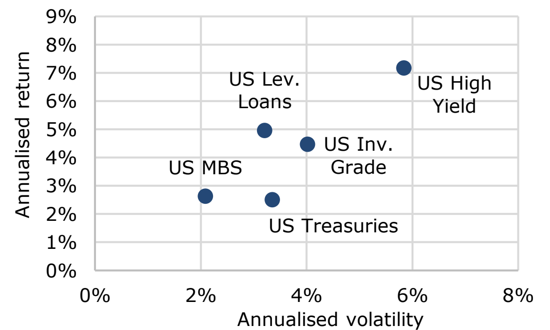
Period	Return (%)	Ann. Ret. (%)	Ann. Vol. (%)
Dec. 1999 to Nov. 2018	135.5	4.6	2.6

Source: Bloomberg Barclays, Fidante Partners. To 30 November 2018. Past performance is not a reliable indicator of future results.

Furthermore, US MBS has demonstrated attractive risk-return characteristics compared to other US fixed income assets over multiple time periods. For example, the annualised return from the start of 2010 onwards has equalled that for US Treasuries but with not much more than half the risk (as measured by annualised volatility).

Analysis has shown that (agency) MBS has performed strongly during periods of both rising US short-term rates and when US house prices have fallen. Furthermore, the same analysis has demonstrated that in both environments, (agency) MBS returns were higher and volatility lower than over long-term averages, highlighting the potential counter cyclical benefits (and diversification) of (agency) MBS when included in multi-asset portfolios.

Fig 13: Risk-return analysis for US MBS and other US fixed income



Source: Bloomberg, Fidante Partners. From December 2009 to November 2018. Past performance is not a reliable indicator of future results.

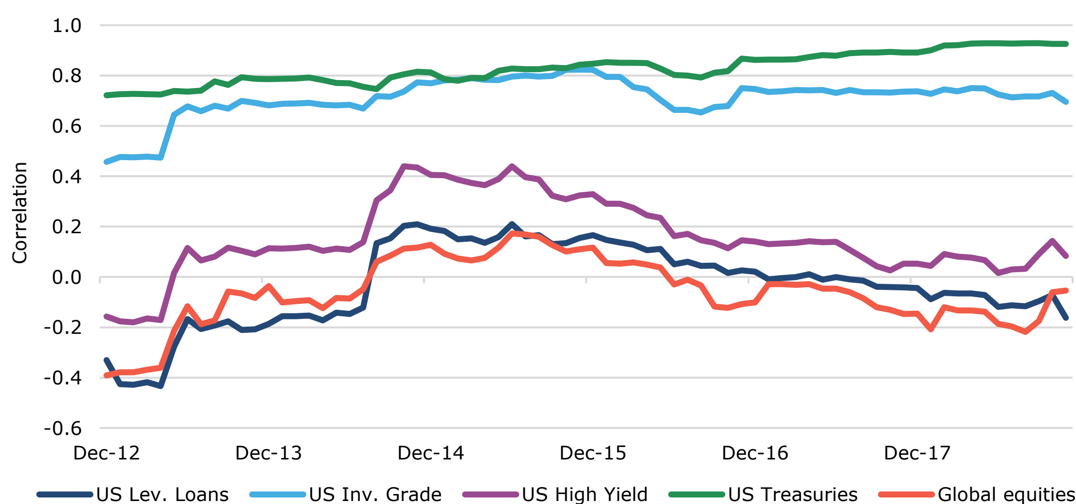
A wealth of factors will impact MBS spreads and how they vary over time, including the type of underlying mortgages, their geographical exposures, specifics with respect to the MBS structure, credit ratings and market perception of the risks and opportunities relative to other investments. However, MBS bonds do generally deliver higher yields than traditional fixed income securities with a similar credit risk. One reason for this is that investors "have" to be compensated for the prepayment risks that apply to these securities (see below). Within the agency MBS sector, both Fannie Mae and Freddie Mac MBS generally offer higher yields than Ginnie Mae MBS, due to their perceived slightly lower credit quality.

MBS in a portfolio context

The MBS asset class has a number of positive attributes which it can bring to investors' (fixed income) portfolios. These include:

- Diversification – most MBS bonds are associated with consumer risk, as opposed to the sovereign and corporate risk which is well-represented in most fixed income portfolios. This attribute may be expected to have contributed to the historically low correlation of MBS returns with other assets. Though the correlations have been quite high with some fixed income assets since the end of 2009 (0.7 with investment grade corporate credit and 0.8 with US Treasuries), there are others for which correlations have been low, or negative (-0.1, 0.1 and -0.1, for US leveraged loans, US high yield and global equities, respectively).
- The specific nature of MBS, in terms of their structure, credit rating, sector and geographical exposure, means that investors can target the appropriate exposure and level of risk for their portfolios.
- Finally, given their enhanced yields, MBS have the potential to boost the overall portfolio yield when included in portfolios with other assets.

Fig 14: Rolling three-year correlations for US MBS



Source: Bloomberg, Fidante Partners. Past performance is not a reliable indicator of future results.

ABS under Solvency II

Since 2016, insurance companies in the European Union and the European Economic Area (EEA) have had to follow the Solvency II regulations that define the solvency capital requirements for investments. These rules were developed in the aftermath of the 2008 Global Financial Crisis to help prevent the most egregious actions that had led to the declines in MBS.

Solvency II includes compliance with European risk retention standards that require originators of structured credit products such as MBS to retain a material net economic interest of 5% in issued securitisations. Under the Volcker rule adapted in the US in 2011 these risk retention rules also applied to US issuers, but in early 2018 a court ruling effectively abolished the risk retention rules for US issues. However, they remain in place for European issues. This also means that investors in European issues enjoy a higher degree of security than investors in US issues because the risk retention rules create an incentive for issuers not to issue MBS with hidden risks.

In order to provide an additional layer of safety, insurance companies must ensure that a minimum amount of solvency capital is assigned to investments in structured credit products in order to create a buffer against potential drawdowns. The size of this

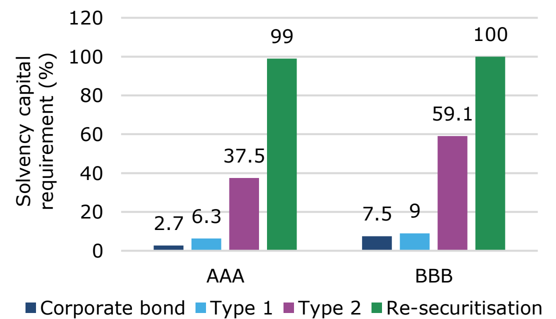
capital buffer, known as the Solvency Capital Ratio (SCR), depends on the credit quality of the investment as well as the credit spread duration.

The Solvency II regulations create significant differences in SCR for so-called type 1 and type 2 securitisations. Type 1 securitisations are the most senior tranches of MBS, such as performing RMBS. These type 1 securitisations are considered less risky by the regulator and hence command a much lower capital requirement than type 2 securitisations. Type 2 securitisations are any tranches and securitisations that do not qualify as type 1, and this includes CMBS. Finally, there are re-securitisations, which are structured credit products based on structured credit products (e.g. CMOs) that command SCRs that are prohibitively high in almost every case.

In the chart below, we show a comparison of SCR for AAA-rated and BBB-rated investments with a spread duration of three years. We compare a standard corporate bond with a type 1 securitisation, a type 2 securitisation and a re-securitisation. The chart shows that while type 1 securitisations tend to have similar solvency capital requirements to traditional corporate bonds, type 2 securitisation and re-securitisations command solvency capital requirements that tend to be five to ten times higher than the capital requirements for type 1 securitisations.

It should be noted that the Simple, Transparent and Standardised (STS) securitisation framework is set to be introduced in January 2019 for all EU securitisations. Apart from introducing new due diligence and risk retention requirements under existing legislation, this should have the effect of lowering the capital charges associated with MBS for insurance companies which may, in turn, result in insurers stepping back into the market.

Fig 15: Solvency II capital requirements for different types of securitisations



Source: Fidante Partners.

Summary

As with ABS more generally, MBS bonds have a number of general structural attributes, which can be summarised as follows:

- Non-agency MBS are **bankruptcy remote**, as the assets sit within a segregated legal entity – the SPV – protecting MBS holders from external events such as a bankruptcy of the sponsor.
- MBS are **direct recourse** investments, backed by specific pools of mortgages, with the coupons and principal repayments generated by the underlying assets,
- Certain types of MBS, specifically non-agency MBS, have **built-in loss protection**, together with multiple layers of risk, which means that the junior tranches take on losses ahead of the senior tranches;
- MBS are **highly granular**, typically containing many mortgage loans in their reference pools;
- MBS issuers in Europe are required by the regulatory authorities to retain at least 5% of the credit risk of the underlying asset pool through the lifetime of the MBS securitisation, also known as **"skin in the game"**, helping ensure that there is alignment of interest with the end investors.

Average MBS performance[1] has generally been steady over the years, including the period during and immediately after the GFC, and has compared well to other fixed income assets on a risk-adjusted basis. MBS also typically offer an attractive yield premium over, say, US Treasuries. These performance characteristics, together with generally low correlations to other asset classes, suggest that benefits can be gained when included in investors' portfolio.

[1] Past performance is not a reliable indicator of future results.

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