Macquarie Presents: Agency Mortgage-Backed Securities

Potential benefits and opportunities

February 2017
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LIBOR (London Interbank Offered Rate) is a benchmark to set repayments on many types of loans and financing deals. The convention usually goes by “LIBOR + x bps” where x = inter alia, a risk premium charged by the lender to the borrower. For example, the repayments on a term financing facility may be quoted as 3m USD LIBOR +250. This means the interest rate on the facility would be the 3 month USD LIBOR rate, plus 2.5% (250bps).

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Potential benefits of Agency MBS
Yield advantage and U.S. government backing

High yield per unit of duration
U.S. Government guarantee features and no credit risk

<table>
<thead>
<tr>
<th>Index</th>
<th>US MBS</th>
<th>US Treasurys</th>
<th>US IG Corporates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average yield</td>
<td>5.18%</td>
<td>3.77%</td>
<td>5.46%</td>
</tr>
<tr>
<td>Average duration</td>
<td>3.50 years</td>
<td>5.41 years</td>
<td>6.22 years</td>
</tr>
<tr>
<td>Yield/duration</td>
<td>1.48</td>
<td>0.70</td>
<td>0.88</td>
</tr>
</tbody>
</table>

Source: Bloomberg Barclays Indices daily data from 1990-2016
Bloomberg Barclays U.S. Mortgage Backed Securities Index (US MBS), Bloomberg Barclays U.S. Treasury Index (US Treasurys), and Bloomberg Barclays U.S. Corporate Investment Grade Index (US IG Corporates)
Yield advantage over Treasurys = alpha

Since 1990, MBS outperformed Treasurys 87% of the time over longer horizons

<table>
<thead>
<tr>
<th>Return horizon</th>
<th>1-year rolling</th>
<th>3-year rolling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive months*</td>
<td>227</td>
<td>281</td>
</tr>
<tr>
<td>Negative months*</td>
<td>97</td>
<td>43</td>
</tr>
<tr>
<td>Outperform odds**</td>
<td>70%</td>
<td>87%</td>
</tr>
<tr>
<td>Average return of positive months</td>
<td>1.52%</td>
<td>0.98%</td>
</tr>
<tr>
<td>Average return of negative months</td>
<td>-0.99%</td>
<td>-0.31%</td>
</tr>
</tbody>
</table>

Source: Bloomberg Barclays Indices monthly data 1990-2016
Bloomberg Barclays U.S. Mortgage Backed Securities Index (MBS) and Bloomberg Barclays U.S. Intermediate Treasury Index (Treasurys)
Chart represents the difference between monthly MBS and Treasury returns, annualized over 1 and 3 years. Intermediate Treasury more closely match the duration of the MBS Index

*The number of months when 1-year or 3-years rolling returns were positive (+) or negative (-)

**Outperformance odds = number of positive months / (number of positive months + number of negative months)
Liquidity advantage

Market size and liquidity only rivalled by Treasurys

<table>
<thead>
<tr>
<th>Asset class</th>
<th>US MBS</th>
<th>US Treasurys</th>
<th>US IG Corporate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market size (USD bn.)</td>
<td>5,362</td>
<td>6,893</td>
<td>4,907</td>
</tr>
<tr>
<td>Daily trade volume (USD bn.)</td>
<td>216</td>
<td>515</td>
<td>26</td>
</tr>
</tbody>
</table>

Data as of 12/30/2016. Daily trading volume calculated as the average over the last 5 years.
**Portfolio diversification**

High correlation to Treasurys and low correlation to stocks

<table>
<thead>
<tr>
<th>Correlation of MBS returns to:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>Years</td>
<td>Treasurys</td>
<td>IG Corp</td>
<td>HY Corp</td>
<td>EM</td>
<td>Global Agg</td>
</tr>
<tr>
<td>Historical</td>
<td>1990-2016</td>
<td>0.85</td>
<td>0.72</td>
<td>0.14</td>
<td>0.30</td>
<td>0.63</td>
</tr>
<tr>
<td>Last 20 years</td>
<td>1997-2016</td>
<td>0.83</td>
<td>0.65</td>
<td>0.04</td>
<td>0.28</td>
<td>0.60</td>
</tr>
<tr>
<td>Last 10 years</td>
<td>2007-2016</td>
<td>0.81</td>
<td>0.54</td>
<td>0.01</td>
<td>0.41</td>
<td>0.60</td>
</tr>
<tr>
<td>Last 5 years</td>
<td>2012-2016</td>
<td>0.83</td>
<td>0.75</td>
<td>0.23</td>
<td>0.53</td>
<td>0.66</td>
</tr>
<tr>
<td>Last 3 years</td>
<td>2014-2016</td>
<td>0.86</td>
<td>0.75</td>
<td>0.14</td>
<td>0.41</td>
<td>0.60</td>
</tr>
<tr>
<td>Global Financial Crisis</td>
<td>2007-2008</td>
<td>0.88</td>
<td>0.58</td>
<td>0.05</td>
<td>0.52</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Source: Bloomberg Barclays Indices monthly data from 1990-2016

Bloomberg Barclays U.S. Mortgage Backed Securities Index (MBS), Bloomberg Barclays U.S. Treasury Index (Treasurys), Bloomberg Barclays U.S. Corporate Investment Grade Index (IG Corp), Bloomberg Barclays U.S. Corporate High Yield Index (HY Corp), Bloomberg Barclays EM USD Aggregate Index (EM), Bloomberg Barclays Global Aggregate Index (Global Agg) and Standard and Poor's 500 Index (S&P 500)

Focus on low correlation to equities
## Risk / Reward Profile

An attractive opportunity set for fixed income investing

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized return</td>
<td>6.06%</td>
<td>5.81%</td>
<td>6.87%</td>
<td>6.12%</td>
<td>9.39%</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>2.88%</td>
<td>4.43%</td>
<td>5.29%</td>
<td>3.65%</td>
<td>14.44%</td>
</tr>
<tr>
<td>Risk-adjusted return</td>
<td>2.10%</td>
<td>1.31%</td>
<td>1.30%</td>
<td>1.68%</td>
<td>0.65%</td>
</tr>
<tr>
<td>Negative quarters</td>
<td>18</td>
<td>37</td>
<td>29</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Lowest quarterly return</td>
<td>-2.32%</td>
<td>-3.84%</td>
<td>-7.80%</td>
<td>-2.98%</td>
<td>-21.94%</td>
</tr>
</tbody>
</table>

**Lowest quarterly return in stress scenarios***

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>-2.32%</td>
<td>-3.02%</td>
<td>-3.52%</td>
<td>-2.87%</td>
<td>-3.79%</td>
</tr>
<tr>
<td>1997</td>
<td>0.13%</td>
<td>-0.86%</td>
<td>-1.01%</td>
<td>-0.56%</td>
<td>2.68%</td>
</tr>
<tr>
<td>2003</td>
<td>0.51%</td>
<td>-0.93%</td>
<td>-0.09%</td>
<td>-0.15%</td>
<td>-3.15%</td>
</tr>
<tr>
<td>2008</td>
<td>-0.49%</td>
<td>-2.10%</td>
<td>-7.80%</td>
<td>-1.02%</td>
<td>-21.94%</td>
</tr>
<tr>
<td>2013</td>
<td>-1.96%</td>
<td>-1.93%</td>
<td>-3.31%</td>
<td>-2.33%</td>
<td>2.91%</td>
</tr>
</tbody>
</table>

Source: Bloomberg Barclays Indices monthly data from 1990-2016

Bloomberg Barclays U.S. Mortgage Backed Securities Index (MBS), Bloomberg Barclays U.S. Treasury Index (Treasurys), Bloomberg Barclays U.S. Corporate Investment Grade Index (IG Corp), Bloomberg Barclays Global Aggregate Index (Global Agg) and Standard and Poor's 500 Index (S&P 500)

*Stress scenarios represent historical events when financial markets experienced significant volatility (i.e. 1994 bond market selloff, '97 Asian Crisis, '03 massive refinancing wave (MBS specific), '08 GFC, '13 Taper Tantrum)
02
MBS primer
Embedded optionality of MBS

MBS versus callable corporates

Callable corporate bonds

- Bond holder selling a call option to issuing corporation/borrower
- Value of call option:
  - Efficient
  - Economic
  - Measurable

MBS bonds

- Bond holder selling a call option to a pool of borrowers (in some cases thousands)
- Value of call option:
  - Emotional
  - Inefficient
  - Non-economic at times
  - Affected by many factors

Inefficiencies and complexity in valuing MBS optionality could create opportunity

Source: Macquarie
Prepayment risk premium

US mortgage borrowers can repay principal in full or part at any time

Prepayments tend to occur for one of several reasons:

- **Refinancing** into a new mortgage with a lower interest rate to reduce monthly payments
- Sale of property because of relocation or a move to a new house (**turnover**)
- Partial payments (**curtailments**)
- Defaults
- **Non-economic reasons** (death, divorce etc.)

Agency MBS spreads tend to compensate for prepayment risk, not credit risk

Source: Macquarie

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For illustrative purposes only.

- Interest payment
- Scheduled principal
- Prepayment
Impact of changing mortgage rates on prepayments

MBS tend to, historically, have uncertain durations and reinvestment

<table>
<thead>
<tr>
<th>Mortgage rate</th>
<th>Prepayment</th>
<th>Need to reinvest</th>
<th>MBS duration</th>
<th>MBS purchased at discount</th>
<th>MBS purchased at premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down</td>
<td>Increase</td>
<td>More at lower rates</td>
<td>Shorten</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Up</td>
<td>Decrease</td>
<td>Less at higher rates</td>
<td>Extend</td>
<td>Negative</td>
<td>Positive</td>
</tr>
</tbody>
</table>

- ReInvestment hurdles
- Negative convexity
  - MBS duration shortens when rates decrease
  - MBS duration extends when rates increase
- Principal returned at par:
  - Benefits holder of discount MBS when rates decrease
  - Benefits holder of premium MBS when rates raise

Timing of principal payment is critical when managing MBS portfolios

Source: Macquarie
Passive versus active management
Passive MBS strategies

Index constituents are non-traded aggregates **not** actual CUSIPs

<table>
<thead>
<tr>
<th>Asset</th>
<th>US MBS Index</th>
<th>MBB ETF (iShares MBS)</th>
<th>MBG ETF (SPDR Bllbg Barclays Mortg Backed Bd ETF)</th>
<th>VMBS ETF (Vanguard Mortgage-Backed Securities ETF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider</td>
<td>Bloomberg Barclays</td>
<td>Blackrock iSHARE</td>
<td>State Street SPDR</td>
<td>Vanguard</td>
</tr>
<tr>
<td>Market value</td>
<td>5,362 USD Bil</td>
<td>9.9 USD Bil</td>
<td>0.3 USD Bil</td>
<td>3.0 USD Bil</td>
</tr>
<tr>
<td>Expense ratio</td>
<td>n/a</td>
<td>0.29%</td>
<td>0.20%</td>
<td>0.07%</td>
</tr>
<tr>
<td>1 year return</td>
<td>1.67%</td>
<td>1.26%</td>
<td>0.89%</td>
<td>1.29%</td>
</tr>
<tr>
<td>3 year return</td>
<td>3.07%</td>
<td>2.90%</td>
<td>2.84%</td>
<td>2.85%</td>
</tr>
<tr>
<td>5 year return</td>
<td>2.06%</td>
<td>1.73%</td>
<td>1.75%</td>
<td>1.89%</td>
</tr>
<tr>
<td>7 year return</td>
<td>3.11%</td>
<td>2.84%</td>
<td>3.01%</td>
<td>2.97%</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>2.12%</td>
<td>2.31%</td>
<td>2.60%</td>
<td>2.22%</td>
</tr>
<tr>
<td>Min month</td>
<td>-1.72%</td>
<td>-1.88%</td>
<td>-2.26%</td>
<td>-1.89%</td>
</tr>
</tbody>
</table>

Source: Bloomberg Barclays. ETF and Index monthly data from 2010-2016
Bloomberg Barclays U.S. Mortgage Backed Securities Index (US MBS)

For illustrative purposes only.
Active management framework

Focus on security selection and capital preservation instead of replication

- **Macro factors**: Multi-faceted analysis of all factors impacting prepayments
- **Fundamental research**: Bottom-up analysis of underlying borrowers’ prepayment sensitivity
- **Security selection**: Select optimal risk-adjusted securities
- **Duration management**: Control interest rate exposure to drive the consistency of performance
- **Overlay strategies**: Used for principal protection, effective risk management and incremental value

**PORTFOLIO CONSTRUCTION**

- **Macro factors**
- **Fundamental research**
- **Security selection**
- **Duration management**
- **Overlay**
  - Principal protection
  - Tactical opportunities

Combine security selection and risk management

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Macro factors impact prepayments

Focus on:
- U.S. Mortgage rates direction
- U.S. Housing market outlook
- Ability to borrow
- Government policies

To narrow investable universe

*Represents the Mortgage Credit Availability Index ("MCAI") which is a barometer on the availability of mortgage credit using guidelines from institutional investors who purchase loans through the broker and/or correspondent channels. The values of the indices do not represent the actual number of loans available for a given period. Rather, they represent percent changes to the monthly risk adjusted loan offering counts relative to a point in time. For example, in March 2012 (our “base” or “benchmark” period) MBA set the MCAI to 100.00. After that month, the MCAI either moves up or down according to the change in credit availability conditions during that month relative to the base monthly. An index of 110, for example, means there has been a 10-percent increase in availability of credit since the reference period (March 2012); similarly, an index of 90 means a 10-percent decrease. The data for the index calculation is provided by AllRegs® Market Clarity®, a platform that provides underwriting guidelines from more than 85 investors into one place. See this link for additional information regarding AllRegs and the Market Clarity product: answers.allregs.com/mcai-market-clarity.

**Also known as conditional prepayment rate, the CPR 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.

Comprehensive macro approach

Source: Mortgage Bankers Association, S&P CoreLogic, EMBS
Bottom-up fundamental research

Focus on:

- Loan characteristics
  - Borrower mortgage rate
  - Loan size
  - Loan age (seasoning)
  - Servicer and geo distribution
- Prepayment trends
- Security structure

To determine investable universe

Prepayment rate

FNMA 30 Year 5.5% Coupon

Generic – all loans with indicated coupon, excluding low loan balances (max loan size >USD $175,000)
150K MaxLS – only loans with max loan size = USD $150,000
New York – only loans issues to purchase NY state residences

FNMA stands for Federal National Mortgage Association. All data is as of December 31 2016.

Analysis of underlying borrowers’ prepayment sensitivity
Select optimal risk-adjusted securities

Focus on more predictable cash flows

**High coupon securities**
Lower prepayment variability due to seasoning

**Barbell approach**
Avoid uncertain prepayments of cusp** borrowers

**Smaller loan size securities**
Less monthly savings at lower rates

<table>
<thead>
<tr>
<th>MBS security type</th>
<th>Annualized return</th>
<th>Standard deviation*</th>
<th>Risk-adjusted returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Price 98-100</td>
<td>4.06%</td>
<td>2.33%</td>
<td>1.74%</td>
</tr>
<tr>
<td>B: Price 100-102</td>
<td>3.30%</td>
<td>5.11%</td>
<td>0.65%</td>
</tr>
<tr>
<td>C: Price 102+</td>
<td>4.02%</td>
<td>2.57%</td>
<td>1.56%</td>
</tr>
<tr>
<td>(A+C)/2: Barbell</td>
<td>4.04%</td>
<td>2.45%</td>
<td>1.65%</td>
</tr>
<tr>
<td>Generic 5 – 6%</td>
<td>4.19%</td>
<td>2.43%</td>
<td>1.72%</td>
</tr>
<tr>
<td>Loan bal 5 – 6%</td>
<td>4.23%</td>
<td>2.31%</td>
<td>1.83%</td>
</tr>
</tbody>
</table>

Maximize risk-adjusted returns

*Standard deviation is a quantity calculated to indicate the extent of deviation for a group as a whole
**Cusp indicates prices 100-102, which are current production coupons with more volatility

Source: Bloomberg Barclays Conventional 30 Year MBS Indices data as of 01/02/2007 – 12/30/2016.

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Valuation

Spreads are full historically

Nominal spreads: MBS vs. IG Corp
As of January 31 2017

Risk-adjusted yields: MBS vs. IG Corp
As of January 31 2017

Source: Bloomberg Barclays

MBS tends to offer better yields per unit of duration
Fundamentals

More predictable cash flows with less refinancing risk and duration extension potential

Refi risk diminishes at higher rates
As of January 31 2017

Duration extension is less of an issue
As of January 31 2017

Fundamentals and yields tend to improve with higher rates

Source: Mortgage Banker Association and Bloomberg Barclays
Agency MBS supply and demand

On the supply side:
- Home sales slow with higher rates
- Bank retention reduces supply
- Potential U.S. Federal Reserve portfolio runoff (100-200bn wildcard)

On the demand side:
- Bank and overseas demand strong
- Decoupling and trade policy impact foreign demand
- Investor demand should increase with higher rates

Supply/demand outlook favourable for 2017

Technical considerations:

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross supply</th>
<th>Net supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1,159</td>
<td>26</td>
</tr>
<tr>
<td>2012</td>
<td>1,664</td>
<td>29</td>
</tr>
<tr>
<td>2013</td>
<td>1,544</td>
<td>232</td>
</tr>
<tr>
<td>2014</td>
<td>923</td>
<td>69</td>
</tr>
<tr>
<td>2015</td>
<td>1,251</td>
<td>163</td>
</tr>
<tr>
<td>2016</td>
<td>1,472</td>
<td>229</td>
</tr>
<tr>
<td>2017</td>
<td>1,239</td>
<td>213</td>
</tr>
<tr>
<td></td>
<td>1,068</td>
<td>202</td>
</tr>
<tr>
<td></td>
<td>935</td>
<td>203</td>
</tr>
</tbody>
</table>

2017 if mortgage rates are:
- 4%
- 4.50%
- 5%

Source: Bank of America Merrill Lynch supply projections in USD Bil
For illustrative purposes only.

Home sales and supply decrease at higher rates

- In 2010 and 2014, home sales dropped when mortgage rates moved beyond 4.5%
- Pre GFC, easier lending standards supported mortgage rates higher than 5%

Source: Mortgage Banker Association and National Association of Realtors
Current opportunities

05
Agency MBS performance in times of rising rates

Milder drawdowns and shorter recovery

Yearly Returns: 10-year UST rates increased

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield Change</th>
<th>Total Return</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 Yr UST</td>
<td>10 Yr UST</td>
</tr>
<tr>
<td>1988</td>
<td>0.28</td>
<td>6.37</td>
</tr>
<tr>
<td>1990</td>
<td>0.13</td>
<td>6.67</td>
</tr>
<tr>
<td>1994</td>
<td>2.03</td>
<td>-7.85</td>
</tr>
<tr>
<td>1996</td>
<td>0.85</td>
<td>0.10</td>
</tr>
<tr>
<td>1999</td>
<td>1.79</td>
<td>-8.43</td>
</tr>
<tr>
<td>2003</td>
<td>0.43</td>
<td>1.27</td>
</tr>
<tr>
<td>2005</td>
<td>0.17</td>
<td>2.07</td>
</tr>
<tr>
<td>2006</td>
<td>0.31</td>
<td>1.34</td>
</tr>
<tr>
<td>2009</td>
<td>1.63</td>
<td>-9.76</td>
</tr>
<tr>
<td>2013</td>
<td>1.27</td>
<td>-7.81</td>
</tr>
<tr>
<td>2015</td>
<td>0.10</td>
<td>0.91</td>
</tr>
<tr>
<td>2016</td>
<td>0.18</td>
<td>-0.16</td>
</tr>
</tbody>
</table>

We benchmarked the Bloomberg Barclays US MBS Index returns to 3-months prior to the first hike, normalized to 100 across all cycles then looked “forward” at the performance over 24 months.

Source: January 2017 Bloomberg Barclays U.S. Indices

MBS returns during Fed hikes

Improving fundamentals matter

Source: Bloomberg, Barclays and Morningstar
Opportunities in rising rate environment

What we view as optimal security selection

**High coupons versus short rates**

Focus on yield advantage and stable income

**Floater securities**

Reset to higher yields as rates increase

**CMO combinations**

Duration neutral IO + IIO for yield enhancement

<table>
<thead>
<tr>
<th>Security</th>
<th>Base case yield</th>
<th>-25bps</th>
<th>+25bps</th>
<th>+50bps</th>
<th>+100bps</th>
</tr>
</thead>
<tbody>
<tr>
<td>High coupon</td>
<td>2.74%</td>
<td>3.30%</td>
<td>2.00%</td>
<td>1.30%</td>
<td>-0.15%</td>
</tr>
<tr>
<td>2-year Treasury</td>
<td>1.20%</td>
<td>1.68%</td>
<td>0.97%</td>
<td>0.48%</td>
<td>-0.25%</td>
</tr>
<tr>
<td>Floater</td>
<td>1.21%</td>
<td>1.10%</td>
<td>1.25%</td>
<td>1.33%</td>
<td>1.51%</td>
</tr>
<tr>
<td>IO+IIO</td>
<td>7.51%</td>
<td>5.20%</td>
<td>7.30%</td>
<td>7.50%</td>
<td>3.10%</td>
</tr>
</tbody>
</table>

Source: Yield Book. High coupon is FN 995089 (CUSIP 31416BNE4), floater is FNR 16-103 FA (CUSIP 3136AUY96), IO is GNR 16-163 IO (CUSIP 38380TAG1) and IIO is FHR 4449 SA (CUSIP 3137BGND7). Returns generated as 1/26/2017

Risk-adjusted Investment approach to portfolio construction

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## Summary

We believe agency MBS are well suited to the current environment

### Key benefits

- Yield advantage
- Liquidity
- Government backing
- Diversification
- Prepayment risk, not credit risk
- Risk/reward profile

### Active management

- Security selection +
- Capital preservation
- Passive replication non-trivial

### Opportunities

- Broad market
- Seek optimal risk-adjusted securities
- Focus on fundamentals
Agency mortgage backed securities (MBS)

How a US residential mortgage ends up in a MBS

Homeowner
- Takes out mortgage loan

Originator
- Banks
- Mortgage brokers
- Non-bank lenders
- Holds, sells or securitizes mortgage loans

Agencies
- Ginnie Mae
- Fannie Mae
- Freddie Mac
- Issues and guarantees
  - Explicit or implicit government backing

MBS security
- Pool of securitized mortgage loans
- Security is created for investors
- Traded in the secondary market

Agency MBS are guaranteed by U.S. government agencies and are highly liquid
Agency vs. Non-Agency MBS

Side by side characteristics

<table>
<thead>
<tr>
<th></th>
<th>Agency MBS</th>
<th>Non-Agency MBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit protection</td>
<td>Agency guarantee</td>
<td>Subordination, 3rd-party protection,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cash reserves, over-collateralization</td>
</tr>
<tr>
<td>Credit rating</td>
<td>Not-rated, explicit/implicit</td>
<td>Rating agencies AAA for seniors; AA/</td>
</tr>
<tr>
<td></td>
<td>government backing</td>
<td>lower for subordinates</td>
</tr>
<tr>
<td>Underlying collateral</td>
<td>Agency conforming (loan size, LTV,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DTI, credit quality requirements)</td>
<td>Outside Agency guidelines (jumbos, 2nds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>properties, limited documentation,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lower credit)</td>
</tr>
<tr>
<td>Interest shortfall</td>
<td>NO</td>
<td>Potentially if high prepayment</td>
</tr>
<tr>
<td>Cleanup Call</td>
<td>1% (seldom executed)</td>
<td>Usually 10%, sometimes 1% to 5%</td>
</tr>
<tr>
<td>Standardization</td>
<td>HIGH</td>
<td>LOW</td>
</tr>
<tr>
<td>Liquidity</td>
<td>HIGH</td>
<td>LOW</td>
</tr>
</tbody>
</table>

Non-Agency MBS have credit risk (no government backing) and are less liquid

Outstanding mortgage securities (3Q 2016 USD bil)

Source: SIFMA. Agency MBS includes CMOs
Agency CMO opportunities

Structured tranches built from principal and interest cash flows of MBS pools

MBS security

- Pool of MBS securities

Principal and interest cash flows sliced into CMOs

CMO securities

(Various structure options)

- Sequential pay classes
- Time / Principal

- PAC A
- Support A
- PAC B
- Support B
- PAC C
- Support C

PAC: Planned amortization classes
Planned schedule around prepayments

Features of CMO market

- As of Month end December 2016, $1.2 trillion market with issuance between $100-150 billion p.a.*
- Tranches vary by
  - Average life/duration
  - Coupon
  - Stability
  - Prepayment risk
- U.S. Government guaranteed
- Less liquid
- Risk/reward ~
  - Underlying collateral
  - Performance across scenarios

Customized risk/reward securities can provide portfolio diversification

*Source: JP Morgan as of Month end December 2016